

SURGICAL
AND
PHYSIOLOGICAL
ESSAYS.

PART III.

BY

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TO
WILLIAM BLIZARD, ESQUIRE,
F. R. S. and F. A. S.
SURGEON TO THE LONDON HOSPITAL, &c.

S I R,

I AM induced to present the following pages to your notice, as, by this means, an opportunity is afforded me of publicly expressing my grateful sense of your friendly attentions to me, at an early period of my life; and also of declaring my respect for your professional character, in which, a zeal for the promotion of medical science is united to a benevolent earnestness in administering its aid to the afflicted. Such a character must naturally obtain that tribute of respect from all, which I individually have great gratification in offering.

I am, SIR,

Your sincere friend and servant,

JOHN ABERNETHY.

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JOHN ABRAHAM

ESSAY

ON

INJURIES OF THE HEAD.

SECTION I.

WHEN the Members of the Academy of Surgery in France, and when Mr. Pott in England, severally inculcated to the surgeons of their respective countries, the propriety and necessity of trephining the cranium under various circumstances consequent to injuries of the head, they probably recommended a too free and frequent performance of that operation. Such appears to be the opinion of many respectable writers who have published since their time; particularly M. Default of Paris, Mr. Dease of Dublin, and Mr. John Bell of Edinburgh. But al-

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though these writers unite in censuring the frequency of the practice above mentioned, they are very far from being agreed in other respects; and many material points seem to me to require still further explanation.

Believing that the observations which I have had an opportunity of making at St. Bartholomew's Hospital, will enable me to throw some light on this important and intricate subject, I am induced to submit to the public a short account of several cases that occurred there, and the inferences which I drew from them.

The difficulties connected with this part of surgery are sufficiently proved by this circumstance, that, notwithstanding it has at all times excited the attention of surgeons possessing the greatest talents, and enjoying the most extensive field for observation, much difference of opinion still subsists, and the practice that ought to be followed in particular cases, yet remains a matter of dispute. It is not, indeed, probable, that any part of medi-

cal science can in a short time receive all the improvement of which it is capable; for, in proportion as we advance in knowledge, we are led to remark many circumstances in the progress of a disorder, which had before passed without notice, but which, if known and duly attended to, would clearly point out to us the nature and remedy of the complaint. Hence, the records of former cases are of much less value, as the symptoms about which we are now anxious to inquire, have in them been entirely overlooked.

I was led to this remark by reading the Works of Hildanus, Wepfer, Du Quesnay, and others, wherein are to be found a number of interesting cases, which I have been precluded from mentioning, as the nature of them cannot be exactly ascertained in consequence of this deficiency.

Although I have been for many years attentive to the treatment of persons who had suffered injuries of the head, and also to the examination of the parts after death, where

the case has terminated fatally ; I still perceive so many circumstances which require investigation, that I entertain no hope of ever being able to obtain, from my own experience, all the information the subject is capable of affording. I hope, however, that the hints offered in this Essay may have the effect of inducing surgeons to pay a closer attention to cases of this kind, and that thus, by their united observations, the public may at length become possessed of that knowledge, which the labours of an individual could never supply.

In the accounts which we have of the former practice in France, it is related that surgeons made numerous perforations along the whole track of a fracture of the cranium ; and, as far as I am able to judge, without any very clear design. Mr. Pott also advises such an operation, with a view to prevent the inflammation and suppuration of the *dura mater*, which he so much apprehended. But many
cases

cases have occurred of late, where, even in fractures with depression, the patients have done well without an operation. To confirm the accounts that have been given of such cases, and by this means to counteract, in some degree, the bias which long-accustomed modes of thinking and acting are apt to impress on the minds of practitioners, I shall relate the histories of five cases, that occurred at St. Bartholomew's Hospital in the space of twelve months; and afterwards offer a few remarks upon the subject. The principal circumstances only of each case are related; for, as many examples of the same kind are to be found in various surgical books, a minute detail of particulars seems to be unnecessary.

Cases of Fracture of the Cranium with Depression, which terminated favourably, although no Operation was performed.

CASE I.

A woman, about forty years of age, was admitted into the hospital for a wound on her
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head. About a week before she applied for advice, her husband had knocked her down with a brass candlestick. She was stunned by the blow, and lay for some time senseless; but, on recovering, she felt no other inconvenience than the soreness occasioned by the wounded integuments. She had suffered some slight indisposition since the accident.

On examining the head, the right parietal bone was found denuded about two inches in extent; a fracture of the same length was also to be felt; and the bone on one side of the fracture was depressed about the eighth of an inch.—She remained in the hospital a fortnight, without any bad symptom occurring, and was then, at her own desire, discharged, although the wound was not perfectly healed.

C A S E II.

A boy, about twelve years old, received a kick from a horse in Smithfield, which stunned him; and he was immediately brought to the hospital. The integuments of the forehead

head were divided by the injury, and the superciliary ridge of the frontal bone depressed at least a quarter of an inch below its original level; the depressed portion measuring about an inch and half in length.

It is obvious that the bone could not be thus depressed, without a fracture of some part of the basis of the skull occurring at the same time, on which account the case might be considered as more dangerous.—In less than two hours he had recovered from the immediate effect of the blow, being at that time perfectly sensible. Fourteen ounces of blood were taken from his arm; his bowels were emptied by a purge, and saline medicines, with antimonials, were directed to be given. He went on tolerably well for two days, at the end of which time, evident symptoms of considerable irritation of the brain took place. He now complained of pain in his head; slept little; and, when dozing, often started, or was convulsed in a slight degree. To remove these symptoms, he was bled twice, took opening medicines occasionally, was kept

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quiet,

quiet, and without light, and was allowed only a spare diet. By continuing this plan for about three weeks, he perfectly recovered.

C A S E III.

A man, between thirty and forty years of age, received a blow on the forehead from a brick thrown at him, by which the frontal bone was fractured about half an inch above the orbit: the fracture measured two inches in length, and the upper portion of the bone was depressed about the eighth of an inch. He was not even stunned by the blow, and walked to the hospital without assistance, complaining only of soreness in the wounded integuments. Sixteen ounces of blood were immediately taken from his arm; he was confined (much against his inclination) to a scanty and liquid diet, and was purged every second day.—This patient did not experience any illness; and the wound soon healed.

C A S E IV.

A boy, about thirteen years old, had a fracture, with depression, of part of the temporal

ral and parietal bones. By similar treatment, he also escaped without any material ill consequence; but in this case, part of the injured bone exfoliated.

CASE V.

A girl, thirteen years old, had a considerable fracture, with depression, of the left parietal bone. She was not brought to the hospital until ten days after the accident. When admitted, she was feverish, had pain in her head, and the little sleep she got, was very much disturbed: but, by the use of bleeding, with antiphlogistic medicines and regimen, she soon got perfectly well.

The cases above related are not offered to notice on account of any striking peculiarity attending them, but merely to shew that such are not infrequent, as they all occurred within the course of a year. From amongst a great number of similar cases, I shall select the following one, as the symptoms attending it were more violent than ordinary.

CASE

C A S E VI.

A lad, seventeen years of age, had his head pressed between a cart-wheel and a post; by which accident the scalp on both sides was turned downwards, so as to expose the lower half of the parietal bones, the squamous part of the temporal, and also part of the frontal and occipital bones; about a quarter of the cranium being thus denuded of its coverings. The periosteum was in several places stript off from the skull, the scalp much bruised, and the posterior and inferior angle of the left parietal bone was beaten in. The depressed portion which was visible, was an inch in length, and more than an eighth of an inch below the level of the cranium; but the fracture extended along the squamous part of the temporal bone towards the basis of the skull: it could not, however, be traced, as the temporal muscle had not been removed from that part by the injury.—The scalp being cleansed, was replaced, retained in its situation by slips of sticking-plaster, and a slight pressure by bandage was applied. The boy was perfectly sensible,

fible, his pulse regular, and not quickened. He had bled considerably from the temporal artery, which had been divided by the accident: eight ounces of blood were, however, taken from his arm; and some purging medicine was administered next morning, which procured three or four stools.—The next day (*Friday*), his pulse beat nearly 120 in a minute; his skin was hot and dry; and he complained of pain in his forehead. Twelve ounces of blood were taken away, and four grains of pulvis antimonialis ordered to be given three times a day. On *Saturday*, the former symptoms still continued, and were rather increased. The antimonial powder made him sick, or at least increased his disposition to be so. Fourteen ounces more of blood were taken from him; the vibratory feel of his pulse not being altered until that quantity was taken away: the blood, on standing, appeared very buffy. His skin, notwithstanding all this, still remained extremely dry; some antimonial wine was given, which produced vomiting. On *Sunday*, his pulse was evidently lowered by the evacuations he had undergone,
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but it was still quick, and sufficiently strong. The pain of his head remained as before. Having a sufficient number of stools, and the sickness still continuing, the antimonial powder was omitted. He was bled, however, in the vena saphena, and his feet and legs afterwards immersed in warm water; during which, he, for the first time, perspired copiously. A blister was also applied to his neck.—The scalp united, with only a trifling suppuration over the fractured part of the bone; and to this ready union, the lowering plan, by preventing inflammation, seems very materially to have contributed. The matter collected over the fracture was discharged by a puncture, and the boy got well.

It appears very clearly, I think, from these cases, as well as from a great number of others to be found in books, that a slight degree of pressure does not derange the functions of the brain, for a limited time after its application. That it does not do so at first, is very obvious; as persons are often perfectly sensible, and free

from head-ach and giddiness immediately after the injury. Whether it may not produce such an effect at some remote period, is not so easily determined, since this cannot be ascertained but by a continued acquaintance with the persons who had received the injuries. All those, however, whom I have had an opportunity of knowing for any length of time after the accident, continued as well as if nothing of the kind had ever happened to them. In Mr. Hill's Cases in Surgery, two instances of this sort are related; and Mr. Hill knew both the patients for many years afterwards, yet did not perceive any inconvenience to arise. It deserves to be mentioned too, that one of the patients was a sailor, and therefore, probably, led a life of irregularity as well as of exertion. The result of cases of this kind, which I have met with in authors, does not lead to the apprehension of any future mischief: nor is it easy to conceive that the pressure, which caused no ill effects at a time when the contents of the cranium filled its cavity completely, should afterwards prove injurious when they have adapted themselves to its altered

altered size and shape. Severe illness, indeed, does often intervene between the receipt of the injury and the time of its recovery; and many surgeons might be inclined to attribute this to pressure; but it equally occurs where the depressed portion is elevated; several instances of which I shall have occasion to relate, and many others are to be met with in authors. This is a circumstance which nothing but very extensive experience can shew in a true light. If, for instance, a surgeon who was prepossessed with the opinion that elevation of the bone is necessary in every instance of depressed cranium, should have acted upon this opinion in the first, third, fourth, and fifth cases, and afterwards have employed proper evacuations, his patients would probably have had no bad symptoms, and he would naturally have attributed their well-doing to the mode of treatment which he had pursued: yet these cases did equally well without an operation. If the same surgeon had been witness to the disturbance which arose in the second and sixth cases, he would, without doubt, have attributed them to the
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continuance of pressure made by the bone; yet these cases also did well by medical treatment only: and when the symptoms which come on thus, are of the inflammatory kind, they may generally be removed by the same means. Many cases also are to be met with in books, and some are related in the subsequent part of this Essay, where not only great but even fatal mischief ensued, notwithstanding the brain was relieved from pressure at an early period. Another surgeon, prejudiced against the use of the trephine, might, with equal injustice, consider the mischief which ensues in certain cases, as entirely owing to the operation.

The degree of pressure which the brain can sustain without great injury to the system, probably may vary according to the disposition of that organ to be affected by it, the suddenness of its application, and the direction in which it is made; and although it must be very difficult to obtain any precise knowledge on this subject, yet there is great reason to believe that the brain can bear more pressure without

without injury to it, than was formerly supposed. The first of these circumstances seems evident; for in some persons a slight pressure produces severe symptoms; whilst, in others, a much greater degree is borne without inconvenience. Where a compressing cause does not, in the first instance, occasion bad effects, if inflammation of the brain ensues, it seems then to act injuriously; which probably arises from the increased susceptibility of the brain. We can rarely judge of the effects of pressure when any part of the cranium is beaten in by a blow; for in that case the shock generally occasions stupefaction. Internal hæmorrhages, perhaps, afford us the best criterion whereby to determine the effects of pressure on the brain. The seventh case will serve as an illustration of this remark, where it appears that a considerable hæmorrhage must have taken place before it deprived the patient of his faculties; for he walked home, undressed himself, and went to bed, after the trunk of the middle artery of the dura mater had been ruptured. In cases of apoplexy also, the hæmorrhage is generally
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very large before it produces those consequences which destroy life.

The authorities quoted by Morgagni, as well as his own observations, shew that people may recover from apoplexy even after a considerable effusion of blood has taken place. But as such cases are uncommon, and as it appears to me that farther confirmation of them would be highly useful, I have obtained permission of Mr. Wilson, to mention a remarkable case of this kind, which occurred to his notice.—

A gentleman fell down suddenly, and remained for some time in that lethargic state which is usual in apoplectic cases; but afterwards gradually recovered his faculties both of mind and body, and continued to exercise them very perfectly for two years, when a second attack of the same kind took place, and destroyed him. Upon opening the head, the cause of his death became evident; for a large quantity of blood was found in the ventricles, and at the basis of the cranium. But what seemed particularly worthy of attention, was a cavity in the right hemisphere of the brain,

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extending from the front to the back part of the cerebrum, being more than four inches in length, and more than an inch in breadth. Within this cavity were contained flakes of coagulated lymph, and a bloody-coloured fluid, which Mr. Wilson, whose abilities and accuracy of observation entitle his opinion to the fullest credit, was convinced were the remains of the blood extravasated at the first attack.

Though a slight degree of pressure does not immediately affect the functions of the brain, yet it may act in another way,—it may excite inflammation of that organ, as it does of other parts of the body. Its power in this respect, however, will probably lessen by the part becoming accustomed to it; and the cases on record, where fractures with depression have done well, as well as those of recovery from apoplexy, are proofs, that the cause which in the first instance was injurious by its pressure, may continue to exist without inconvenience. Such cases ought surely to deter surgeons from elevating the bone in every instance of slight depression.

depression, since by the operation they must inflict a further injury upon their patients, the consequences of which it is impossible to estimate.—From all, therefore, that I have learned from books, as well as from the observations I have made in practice, and from reasoning upon the subject, I am disposed to join in opinion with those surgeons who are against trephining in slight depressions of the skull, or small extravasations on the dura mater. In the latter, it is probable the compressing cause will soon be removed by absorption; and in the former, according to the observations of Mr. Hill* and Mr. Latta†, the bone will regain its natural level if the subject be young. In adults, however, and especially in persons of advanced life, this circumstance cannot be expected; so that in them the accommodation of the parts to each other, necessary for preventing future mischief, must be effected by a corresponding diminution of the brain.

A circumstance, however, frequently oc-

* Cases in Surgery, p. 113.

† Pract. Syst. of Surgery, Vol. II. p. 172.

curs, that may render the surgeon doubtful as to what course he ought to pursue; this happens when, at the same time that the skull is slightly depressed, the patient labours under the effects of concussion. The circumstances which generally serve to distinguish those two injuries, will be noticed hereafter. At present it is only necessary to observe, that, as the effects of the latter gradually abate, a little delay will enable the surgeon to decide upon the nature of the mischief, and take his measures accordingly. Where the patient retains his faculties, nothing farther is necessary than a continuance of the antiphlogistic plan; and should any disturbance afterwards take place, the same means, employed in a degree proportioned to the urgency of the symptoms, will in most instances be successful without elevating the bone. This happened in four of the six foregoing cases, which are related without any view to this particular point.— But if, from a peculiar disposition of the brain to be affected by pressure, the disorder of that organ should increase; or if, from inflammation of the brain having taken place, the pressure

pressure should then appear to be particularly injurious, the elevation of the bone ought not, I think, to be deferred. And from some of the cases related by Mr. O'Halloran, in the fourth volume of the Transactions of the Royal Irish Academy, it appears that this operation, if not too long delayed, will give effectual relief under such circumstances.

I trust, that nothing which I have said will be construed as insinuating that every depression of the skull may be left unelevated. There certainly are degrees of this injury which it would be highly imprudent to treat in this manner. Whenever the patient retains his senses perfectly, I should think it improper to trephine him, unless symptoms arose that indicated the necessity of it. The cases which I have related will, I believe, justify me in entertaining this opinion, and in thinking that the contrary practice is now carried, by some surgeons, to a prejudicial extreme.

SECTION II.

Injuries of the Head attended with Extravasation of Blood upon the Dura Mater.

In the three following cases the skull was broken, and depressed at the part which covers the middle artery of the dura mater, by which means that vessel was lacerated. The attention of surgeons has not been sufficiently directed to this event, although it is of the utmost importance; for the life of the patient might often be saved, if the nature of the accident were known, and the bone speedily perforated.—These cases likewise display, in a very striking manner, some of the effects caused by great pressure on the brain.

CASE VII.

A man was knocked down by the iron hooks of a crane, which fell upon his head from a considerable height. He was stunned at first, but soon recovered his powers of mind and body so far as to walk home, undress himself, and go to bed. A surgeon was sent for, who,

who, on his arrival, found the man senseless, and in a deep apoplectic state. The patient was immediately brought to St. Bartholomew's Hospital, when the functions of life seemed nearly suspended, as he was almost without sensation, his breathing being slow, irregular and stertorous, with an unequal, intermitting pulse, and cold extremities.—The scalp covering the right parietal bone was wounded; and on dividing it more extensively, a fracture with depression was discovered, running obliquely across the anterior and inferior angle of the parietal bone, over the temporal bone, and extending to the basis of the cranium, before the mastoid process. Several perforations with the trephine were made along the course of the fracture, and the depressed portion taken away. A surprising quantity of congealed blood was found upon the dura mater; the coagulum being not less than an inch and half in thickness, and six or seven inches in circumference. On the removal of this coagulum, the brain, which had been indented by its pressure, remained in the same state as before, nor did it ever regain its ori-

ginal level; so that the patient experienced but little benefit from the operation, and he died about twelve hours after receiving the blow.

The dura mater, in this case, was not torn through in any part; so that the blood could not have come from any vessel within that membrane. The source of such a profuse hæmorrhage, however, could not be doubtful, when it was known that the fracture crossed, and had probably wounded, the principal artery of the dura mater; yet that vessel did not bleed after it was exposed.

C A S E VIII.

A boy, about fourteen years of age, fell from a scaffold near two stories high, and pitched on his head. When brought from Islington to the hospital, he appeared to be almost in a dying state. The anterior inferior angle of the parietal, and part of the frontal bone, were found depressed. A piece of the cranium being taken out with the trephine, I discovered beneath it a large quantity of coagulated

agulated blood; I therefore made the next perforation nearer to the trunk of the principal artery of the dura mater, from which I concluded that this hæmorrhage had taken place. Having gently removed some of the coagulum, and introduced my finger into the aperture which had been made, I passed it as far as the second joint, before I could touch the dura mater. Fluid arterial blood now gushed out in such quantities as to keep the bone covered on which I was next to trephine. I ran no risque, however, in performing the operation; for the dura mater was depressed so much that it could not be injured. But to guard against even the possibility of such an accident, I introduced my finger between the dura mater and skull, and then perforated the bone with the trephine. Having thus removed a third piece, which was directly over the principal artery, I took out about four ounces of coagulated blood; upon which the dura mater quickly rose to its original level, and the hæmorrhage from the wounded artery ceased. I now entirely removed the depressed portion of bone, and thus

thus uncovered all the dura mater which had been detached ; so that I could distinctly feel its connection with the cranium all round. This satisfied me that no more extravasated blood was left behind.—The lad, who at the beginning lay quite insensible, with a feeble, intermitting pulse, and laborious interrupted respiration, became restless, and expressed sensations of pain towards the latter part of the operation. Being now asked, how he found himself? he replied, very well ; Whether his head ached? he answered, no ; If he was sure that he felt no pain? he said he was sure, and wished we would leave him alone.—I now took twelve ounces of blood from his arm, and he was put to bed, where he passed the night quietly. The next morning his bowels were completely emptied by a purge ; and saline medicines, with antimony, were given, so as to keep the skin in a gentle state of perspiration. During the day he was sleepy, and lay quiet ; answered questions very rationally, and complained of pain and giddiness in his head.—The third day he was disturbed, and less rational. Eight ounces of blood were
taken

taken from him, and a blister was applied to his neck. These means relieved him greatly, and he became quite tranquil and collected.— On the sixth day, symptoms of irritation again took place, and were again relieved by similar treatment. The dura mater had granulated, and the whole wound looked healthy. Every thing went on remarkably well until the fifteenth day, when the patient was seized with rigor and pain in his head, and the healthy aspect of the wound was also changed. The following day, there was perceived, in the middle of the exposed dura mater, an aperture, through which a protrusion of the brain arose, covered by the pia mater, which retained its natural appearance. In less than 24 hours this tumour increased to the size of an orange; its surface was dark-coloured, and irregular, and the pia mater no longer distinguishable. The following morning the boy died; and his friends had removed the body from the hospital before I knew of his decease.

I regretted very much that I could not examine the nature of this fungus or hernia cerebri

rebrui, as it was a phenomenon which I had more than once contemplated with surprise, and the nature of which I was afterwards fortunately enabled to ascertain.

CASE IX.

A man was knocked down in Smithfield by a brick-bat, thrown at him by some villains against whom he had appeared as evidence upon a trial. He was immediately brought to the hospital; but in a state of profound apoplexy.—The right side of the frontal bone, and the lower part of the parietal, were beaten in; the area of the depressed piece being about two inches in diameter. After making three perforations in the circumference, I was enabled to remove the depressed portion. I then took out a large handful of coagulated blood, which lay upon the orbitary process of the frontal bone, and had so pressed back the anterior lobe of the brain, that I could, with my finger, touch the transverse spinous process of the sphenoid bone. The brain now rose slowly, in consequence, I suppose, of the blood

blood gradually finding its way through the compressed vessels; and the man began to shew signs of returning sense.—He was bled, and his bowels were emptied by a purge. The next day he was so far recovered as to give an imperfect account of the accident; but on the third day, he died convulsed.

On dissection, some blood was found between the dura and pia mater, and traces of inflammation appeared on the latter membrane.

Mr. Hill, of Dumfries, relates a case (the fifth), where the artery of the dura mater was ruptured without either fracture or depression of the skull; and when he trephined a second time, four days after the accident, he found so large a coagulum of blood lying upon that membrane, as to make him afraid of removing it all at once: but on taking out a few ounces of it, the patient, who had hitherto lain in a state of apoplexy, looked up, on being spoken to, like one awakened from sleep,—knew, and named every body, and raised

raised the arm belonging to the opposite side, which had been paralytic from the time of the accident.

In Mr. Latta's Surgery also, a similar case (as shewn on dissection) is related, in which an uncommon slowness of the pulse, and coma without stertor, were the symptoms produced.

These cases shew that a fracture of the skull is not likely to be followed by an equal degree of extravasation in every part, as the vessels connecting the dura mater to the cranium are, in most parts of that membrane, of a small size. If these are accidentally ruptured, a slight hæmorrhage ensues, which soon stops, and only a thin stratum of coagulated blood is found if the bone be removed. But if the fracture happens in the track of the principal artery of the dura mater; if the trunk, or even a considerable branch of that vessel be torn, the hæmorrhage will be profuse, and the operation of the trephine become

come immediately necessary to preserve the life of the patient. In the three cases that I have related, the operation was done very shortly after the accident: in the first case, the brain was so compressed that it did not regain its level; in the second, it rose slowly as the blood found its way through the vessels; and in the third, it rose quickly, and the functions of the brain were as quickly restored. It can scarcely be doubted, then, that if the operation had been performed in these cases as soon as it became necessary, when, perhaps, only one instead of many ounces of blood were poured forth from the torn vessel, the lives of the patients might have been preserved.

It is of great importance to distinguish accurately the nature of such cases; and the distinction is not difficult when there is an interval of sense between the blow and the stupor occasioned by the effused blood. In the first related case, for instance, the nature of the accident was made sufficiently evident by this circumstance. But though we are
assured

assured that the patient labours under the effects of compression, we cannot, in many instances, know the situation of the compressing cause. In other cases, again, where there is no interval of sense after the accident, we are at a loss to determine whether the senseless state be the effect of compression or of concussion. Every surgeon must acknowledge that it would be a very desirable thing to ascertain when blood is effused between the dura mater and the skull; for if the extravasation has happened in the more interior parts, a surgical operation is not likely to afford relief*. Now, if the extravasation which compresses the brain, be situated immediately beneath the bone, I think there are signs by which it will be disclosed; and as sufficient

* In those cases, which I have seen, where blood was extravasated between the dura and pia mater, and a division of the former membrane was made for its discharge, the serous part of it only could be evacuated; for the coagulum was spread over the hemisphere of the brain, and had descended as low as possible towards its inferior part, so that very little relief was obtained by the operation. It seems then, that extravasation between the dura mater and the cranium is almost the only case which admits of being remedied by the use of the trephine.

notice has not been taken of these, I wish particularly to call the attention of surgeons to them.

I have already said, that, unless one of the large arteries of the dura mater be wounded, the quantity of blood poured out will probably be inconsiderable; and the slight compression of the brain which this occasions, may not be attended with any peculiar symptoms; or perhaps it may occasion some stupor, or excite an irritation disposing the subjacent parts to become inflamed: but both these effects will gradually abate, nor will any inflammation ensue, if proper means are taken to prevent it. It is indeed highly probable, that, in many cases which have done well without an operation, such an extravasation has existed. But if there be so much blood on the dura mater as materially to derange the functions of the brain, the bone, to a certain extent, will no longer receive blood from within; and by the operation performed for its exposure, the pericranium must have been

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separated from its outside. I believe that a bone so circumstanced will not be found to bleed; and I am certain it cannot, with the same freedom and celerity as it does when the dura mater remains connected with it internally. I need hardly say, that, in the cases which I have related, there was not the least hæmorrhage. But it is right to mention, that I have also twice been able, by attending to the want of hæmorrhage from the outside of the cranium, to ascertain the extent to which the dura mater was detached within; and very frequently, when symptoms appeared to demand a perforation of the skull, I have seen it contra-indicated by the hæmorrhage from the bone, and, as the event has proved, rightly.

When the bone has remained long bare, the case may become perplexing. I once scraped a portion of the cranium which had been some time denuded, and found that it bled in such a manner, as sufficiently to point out the adhesion of the dura mater, and of course

course the inutility of employing the trephine*.

Where the extravasation on the dura mater is but small, it will probably not require any operation. A slight hæmorrhage from the bone, which may happen from the anastomosing of the vessels within its substance, will not, in this case, lead to any injurious error. But from what I have observed, I am inclined to believe, that even a small effusion of blood will diminish the hæmorrhage from the superincumbent bone.

Mr. Pott had an idea, that the bone would perish when the dura mater was detached for

* In aged persons, and in those in whom the circulation has been rendered languid by the accident, the mode of distinction which I have pointed out, may indeed be less conclusive.

Although a contrary opinion has been entertained, yet it appears evident, particularly in apoplectic cases, that vessels enter the cranium from every part of the dura mater. To ascertain more fully this circumstance, I have injected the principal arteries of the dura mater with glue (after having removed the upper part of the cranium and the scalp), when the injection has passed through the bone into the vessels of the scalp; and the connection by vessels, which I have alluded to, has been evident in every point.

a considerable space from its inside; and some cases which he has related, seem to favour this opinion: but many other cases to be met with in authors, and many which have occurred to my observation, prove that the opinion was not well founded. Indeed we cannot suppose that the bone would perish from this cause; for it still receives blood, not only from the anastomosing of vessels within its substance, but also from the pericranium externally; and the success which has of late attended the operations for aneurism in the lower limbs, shews that parts of great bulk and vascularity will continue to live when their usual supply of blood is very much diminished. If, however, the dura mater should be detached for a considerable extent from the inside of the skull, at the same time that the pericranium should also be stripped from its outside, I am inclined to believe that a portion of the bone would, in that case, die and exfoliate.

SECTION III.

Cases of Fungus or Hernia Cerebri.

CASE X.

A man, about forty years of age, was knocked down, and had a considerable part of the parietal bone, near the coronal suture, depressed, by a stone falling on his head from a high building. A portion of bone was taken out, and the depressed piece elevated. The patient, after this, seemed to obtain great relief from the stupor under which he had till then laboured. But the next day, he became very restless and delirious, and frequently endeavoured to get out of bed. Evacuations were prescribed, and a blister applied to his head, by which means the symptoms were lessened, but did not entirely go off; they continued near six days, only varying somewhat in degree. His strength was now very much reduced; and though he became more tranquil, he was still delirious, and a coma supervened, which increased daily.—On the tenth day, upon uncovering the wound in or-

der to dress it, a hernia cerebri appeared, rising through an ulcerated opening in the dura mater. The tumour at this time was not larger than a pigeon's egg; the pia mater, stretched over its surface, was inflamed; and a turbid serum oozed at its side, from beneath the dura mater. On the following day, the tumour had acquired the size of a hen's egg, was still smooth on its surface, and apparently ready to burst. On the day after, before the time of dressing, the man died.—Upon examining the tumour now, it was found larger than before, and of a dark colour, with an irregularly granulated surface; which appearance seemed owing to coagulated blood which adhered to its surface, as the part had bled so much, that one half the cap which the man had worn, was rendered quite stiff by it. In raising the top of the skull to inspect the contained parts, the tumour was in some degree torn from its basis. The pia mater was in general much inflamed, and, as well as the dura mater, was deficient at the place where the tumour protruded. A part of this tumour being cut off where it was lacerated, appeared

to consist of coagulated blood of a fibrous texture. The brain was now taken out, and the tumour carefully examined, when it was found to be of the same nature throughout, and to have originated within the substance of the brain, about an inch below the surface; but I could not discover the open vessel from which the hæmorrhage had proceeded.

The appearances, on dissection, clearly explained the cause of the symptoms which had taken place, and rendered it evident, that the disease under which this man had chiefly laboured, was inflammation of the pia mater. The nature of the tumour, also, was not less satisfactorily pointed out. It was plain, that, in consequence of the brain being injured to some depth beneath the surface, disease of the vessels, and consequent effusion of blood, had ensued; that the effusion was for a time restrained by the superincumbent brain and its membranes; but these gradually yielding to the expansive force exerted from within, and at last giving way altogether, the fluid blood oozed out and

congealed upon the surface of the tumour. It appears very probable, that the disease generally described by the term *hernia cerebri*, consists, as in this instance, of a tumour formed by coagulated blood ; for an organized fungus could hardly be produced in so short a time as that in which these tumours are usually formed.

CASE XI.

A carpenter, while at work in a newly-built house, was crushed by a part of the wall falling in upon him. His abdomen was bruised, his clavicle broken, and his head wounded. Beneath the wounded scalp, the right parietal bone was found fractured and depressed. He was slightly comatose for many hours after being brought to the hospital, yet answered rationally to those questions that were put to him. As the coma, however, remained, and his pulse did not beat with the freedom that is usual, the surgeon under whose care he was admitted, thought it right to trephine him. Accordingly, one perforation being made, the depressed bone was elevated.

No

No blood was found upon the dura mater, nor did any thing indicate the propriety of using the trephine a second time. The patient was largely bled; and saline medicines, with antimony and opium, were given. As he complained much of pain in his belly, fomentations were applied to this part, and clysters administered occasionally. He was again bled on the second and fourth days after the operation. At the end of a week the antimony was omitted, on account of his weakness; and he seemed to get rather better, until December 7, twelve days after the accident, when a hernia cerebri appeared, rising through an aperture in the dura mater, opposite to the perforation in the skull. It increased rapidly in size, and exhibited the same appearance described in the foregoing case.— Two days after this, the patient died.

On examining the head, the dura mater was found every where adherent to the skull; but on its inner layer there was a secretion of pus. The hernia cerebri, which had pushed
up

up through an ulcerated opening in the dura mater, was of a fibrous texture, and evidently formed of congealed blood deposited in the medullary part of the cerebrum; the containing cavity being about an inch diameter, and its parietes appearing to be the substance of the brain condensed by pressure. I was equally unsuccessful here in my search after the vessel, whence the blood had issued. The ventricles of the brain were full of a serous fluid mixed with blood, and a large abscess was also found in the spleen.—In this case, the mental faculties were not deranged as in the former. Both the symptoms and dissection shew the disease to have consisted in the effects of concussion, with inflammation of the dura mater, and subsequent effusion into the ventricles of the brain.

The opinion I had formed respecting the nature of hernia cerebri was now confirmed; and I think it received additional illustration from the following case, although the disease was in a different part of the body.—A patient

tient in the hospital had a disease in the head of the tibia, from whence there arose an unhealthy fungus, which Mr. Blicke removed; and afterwards, the bone was kept bare by caustic applications, in hopes that a separation of the diseased parts would take place. The patient, however, became feverish, and his health was much impaired. On the cessation of the fever, there suddenly arose, within the wound, a fungus-like substance, about the size of a large apple, which seemed to sprout from the bone; it was of a livid colour, and its surface appeared as if covered with sloughs. I took off the tumour, which was nothing but coagulated blood, with the knife; and some blood oozed from its basis, but the hæmorrhage was stopped by the application of lint. In a few hours, however, a similar fungus-like tumour arose. As both the size and situation of the open vessel were unknown, and as the patient could neither support the loss of much blood, nor the irritation which an extensive wound, made in search of the artery, together with that arising from the diseased

cased bone, would infallibly produce, it was judged best to remove the limb. This was accordingly done; and upon injecting water into the popliteal artery, it was found to be a branch of that vessel which had given way.

It seems that Paré, and the surgeons who lived about his time, often mistook the tumours that arose out of the cranium, for aneurisms, on account of their pulsatory motion. M. Louis, in the *Mem. de l'Acad. de Chirurgie*, tom. V. has well distinguished the nature and treatment of those proceeding from disease of the dura mater or bone. There may, perhaps, be tumours of various kinds arising from the pia mater and brain; but if there are such, I believe they have not been discriminated; nor have I found an account of any in the writings of authors, which did not resemble those I have described. They have generally been treated of under the name of fungus or hernia cerebri;

cerebri; and if the effused blood of which they consist, ever acquired vascularity, they might then deserve that title: but none of those that I have seen were of an organized structure.—Their formation seems to proceed from an injury done to a part of the brain by concussion or contusion, which has terminated in a diseased state of the vessels, similar to what occurs in apoplexy. The morbid state increasing, one or more vessels give way, and an effusion of blood into the substance of the brain ensues, which, if the skull were entire, would probably occasion apoplexy, but, where there is a deficiency of bone that allows it to expand, presses the surface of the brain and its meninges through the vacant space. The dura mater soon ulcerates, and the tumour pushing through the openings, now increases with a rapidity proportioned to that with which the hæmorrhage takes place within. At last, the pia mater, and the stratum of the brain which cover the effused blood, are so extended as to give way, and the blood oozes out and coagulates.—Thus the quick growth, and all the other phenomena ob-

servable in these tumours, are satisfactorily accounted for.

It seems probable that similar injuries at other times give rise to the formation of abscesses in the substance of the brain, which are not easily ascertained, and which generally occasion the death of the patient.

The plan of treatment to be adopted with tumours of the kind which I have described, is next to be considered; but as I have had no opportunities of acquiring knowledge as to the treatment of these diseases since I became acquainted with the nature of them, I can only offer a few general remarks on this subject.

Where no bad symptoms precede the appearance of the tumour, or where they go entirely away upon its being freed from the confinement of the dura mater, it may, perhaps, be most prudent not to interfere in the treatment of the complaint: for probably the hæmorrhage will cease, and the coagulum will

will drop off in pieces*, or gradually waste away, and be no more renewed†. All that appears necessary, then, under such circumstances, is to cover the tumour and sore with some mild dressing, carefully avoiding all pressure, which both reason and experience shew is likely to be attended with bad consequences. Should the bulk of the tumour, however, become inconvenient, or render pressure from the dressings unavoidable, the practice which present experience has shewn to be most successful, consists in occasionally paring off the tumour with a knife. In this manner Mr. Hill treated several cases with success.

But if the tumour continues to increase, and if the patient suffers a train of bad symptoms,

* See a case in the Edinburgh Medical Commentaries, Vol. I. p. 98, where the tumour continued to increase for fourteen days, and had acquired the size of a goose's egg, when it dropped off in pretty large pieces. A similar case is related in the Medical Museum, Vol. IV. p. 463.

† Fabricius Hildanus relates a case in his Fifteenth Observation, where the tumour arising from the brain became, in 24 hours, as large as a hen's egg, and afterwards gradually disappeared.

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apparently arising from irritation and pressure made on the brain, some further attempt to relieve him seems to be required. Under these circumstances, we have reason to suspect that the coagulum, from want of room to protrude, is enlarging internally; or that by plugging up the orifice in the bone, it prevents the escape of some fluid collected within the cranium*. The obvious mode of relief here appears to be, to enlarge the opening in the bone in proportion to the extent and increase of the tumour. Many surgeons have

* Mr. Hill, in relating a case of this kind, says that he "was obliged to shave away the tumour, and push a lancet into its root as often as the stupor and other symptoms shewed that matter was lodged there, by which the patient was uniformly relieved, and afterwards recovered."—(See his Cases in Surgery, p. 91—2.) But very different was the event in two similar cases (one is recorded by Scultetus, in his *Armamentarium Chirurgicum*, Obs. XIX.; the other in the *Lond. Med. Journal*, Vol. X. p. 277), in which repeated attempts were made to prevent the growth of the tumour by compression: one patient died at the end of a month; the other not until nearly six months after the accident. In the brain of each there was found, upon dissection, a large cavity, which had been formed by the accumulation of a fluid that could not escape, on account of the aperture in the bone being closed by the tumour.

objected

objected to the removal of much of the cranium, lest protrusions of this kind should ensue; but it is evident that these tumours arise from an injury and consequent disease of a part of the brain, the event of which must be more fatal if the bone was entire. A large removal of bone was formerly a frequent event; but a protrusion of this kind very seldom took place.

But although, by thus allowing a free escape to the effused blood, we may prevent the injurious effects of its pressure on the brain, yet the degree of hæmorrhage may endanger the life of the patient.

The quantity of blood effused will depend on the magnitude of the vessels, or on their disposition to bleed. As the disease is generally situated not far beneath the surface of the brain, there is less risque of its proceeding from the former cause. If it arises from the latter, it is very likely that the distention caused by the confinement of the effused blood would irritate the vessels, and keep up
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their disposition to hæmorrhage; therefore the treatment already recommended is likely to diminish it. But should the quantity of the hæmorrhage seem to threaten the life of the patient, I should think it most proper to take away the coagulum, and to expose the cavity in the brain, in order to learn whether suffering some sudden loss of blood to take place, together with the exposure of the bleeding vessels, might not produce a beneficial change, and a cessation of the hæmorrhage. I am induced to propose this mode of conduct, from reasoning founded on analogy; for in other parts of the body a hæmorrhage will sometimes continue, notwithstanding a considerable pressure made by a large quantity of coagulum, together with that which the resistance arising from the closure of the external opening, and that which is occasioned by the dressings, conjointly produce. Yet, upon exposing the bleeding surface, the hæmorrhage will cease, and never afterwards be renewed.

I am still further induced to propose this plan of treatment, because I do not perceive

any

any other which carries with it a probability of success. The impropriety of attempting to restrain the hæmorrhage by pressure has been shewn; ligatures cannot be applied, and styptics are known, by experience, to be dangerous.

I shall extract one case from the first volume of the *Memoires de l'Academie de Chirurgie**, to shew that the removal of the coagulum is not likely to be attended with any alarming consequences.—A young man received a blow on the right parietal bone, which occasioned a fracture; some bone was removed, and a hernia cerebri was afterwards produced, which was repeatedly pared down with the knife. On the thirty-fifth day from the accident, the patient having intoxicated himself, while in this state, slipt his hand under the dressings, and laying hold of the protruding coagulum, tore it away with violence. The next day the surgeon found, that almost the whole of what he considered as corrupted brain, was removed, and a vacancy left, so deep, that he could see nearly to the

* See the Memoire of Mr. Du Quesnay, 10th Observation.

corpus callosum. From this time forward the parts went on healing, until they got quite well; but the patient continued to labour under a paralysis of the left side, which had supervened the day after he received the blow.

It is obvious, from the nature of the substance of which the tumour is composed, that styptic remedies applied to its surface can have scarcely any effect in lessening its bulk, and none at all in putting a stop to its growth; and experience shews, that the more active of them are not only ineffectual, but highly dangerous. Hildanus, in his Fourteenth Obs. relates the case of a man who died in consequence of an empiric having dressed a tumour of this kind with alum and calcined vitriol. And Mr. Hill tells us (p. 198), that, after shaving off the protruding part, he once sprinkled the basis with some blue vitriol, and another time with red precipitate; but found that "his patient had a very bad day after each of these;" no doubt, in consequence of their being dissolved in the discharge, and insinuating themselves between the tumour and the edges

edges of the skull, so as to get into contact with the sensible parts within; for, that it was not owing to their effect upon the tumour, is evident from the freedom with which he had removed it with the knife.—Whether, in the case of the hæmorrhage continuing after the coagulum has been removed and the vessels exposed, any of the vegetable astringents diluted, such as infusion of galls, might be successfully applied to stop the bleeding, is a question which future experience must determine.

SECTION IV.

Concussion of the Brain.

As I am of opinion that the effects of concussion have not been justly described by authors, and as the symptoms related by them are not, according to my experience, those which usually occur, I have therefore selected two cases out of a great number that I have seen, in order to shew what have appeared to me the common consequences of this injury; and I shall afterwards offer some remarks respecting the treatment of this disease.

CASE XII.

Harriet Silverthorn, aged twenty-three years, slipped down stairs, and struck her occiput against some of the lower steps, by which the integuments were divided about half an inch in length, but the wound was not deep, nor were the surrounding parts much bruised. She was taken up senseless, was bled, and the next morning conveyed to St. Bartholomew's Hospital. When brought in, she was comatose; could not be made to answer any questions; yet she drew back her arm when pinched, and seemed very uneasy when the wounded parts were pressed upon. Her breathing was without stertor, but performed at some interval, as if she did not wish to inspire until obliged by necessity. The pulse, which was full and labouring, intermitted every fourth or fifth stroke.—Eight ounces of blood were immediately taken away, and an opening medicine given, which procured three stools, after which she was ordered a mixture, containing aqua ammoniæ acetatæ, and antimonial wine.—The next day (*Friday*), she was rational,
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put out her tongue when desired, and said she had no pain in her head; her breathing was more regular, and her pulse free from intermission. (*Saturday,*) she was still more sensible, and gave some account of herself; complaining now of head-ach, and general uneasiness. The mixture was continued, the purging medicine given again, and a blister laid on between her shoulders.—(*Sunday,*) her pulse was harder; she was sensible, but restless; complained of pain in her forehead, sat up in bed, and wanted to go home. Six or eight ounces of blood were taken from her temples, and the mixture ordered to be continued as before.—(*Monday,*) she was much more composed; but as she had still some pain in her head, a blister was applied to it.—(*Tuesday,*) she had slept quietly during the night, answered rationally, but with quickness, and eagerly desired to go home. As the blisters appeared to have been serviceable, that on her neck was renewed.—(*Wednesday,*) she was perfectly quiet, and in every respect better; nor had she, after this, any complaint worth mentioning.

C A S E XIII.

A Frenchman, twenty-seven years of age, who had been many years in England, and (as it afterwards appeared) spoke our language perfectly, had met with some accident (but in what manner, I know not), in consequence of which he was brought to the hospital. He was then very comatose, and expressed much uneasiness at being roused from that state; yet he put out his tongue when bid, but did not give a rational answer to questions put to him, and his replies were made in his native language. His pulse was regular, strong, and about 96 in a minute. Ten ounces of blood were taken from his arm; and after being purged, the common saline mixture, with antimonial powder, was ordered to be given. In the night, he grew delirious, got out of bed, and tore the bandage from his arm; in consequence of which he lost a good deal of blood before it was perceived. This, however, seemed of use to him; for he became more tranquil after it, and lay quietly dozing till morning. Next day, he was more rational, and complained of pain in his head. When I

told

told him that if he kept quiet, he would soon be well, he said, he hoped so; and appeared solicitous to know what should be done to him. His pulse was only 80, and not strong. A gentle laxative was given, and a blister applied to his head.—On the third day, he was much more sensible, spoke with clearness, and mentioned the pain being in the fore-part of his head; yet, when I asked his age, he told me he was but sixteen years old.—*Tuesday* (fourth day), he appeared more excited and wild; his tongue was dry, but his pulse only 75. Nine ounces of blood were taken from the temporal artery.—Fifth day, his pulse was only 70, and perfectly natural, yet he had pulled off the dressing from his blisters, and seemed to be very irritable.—Sixth day, still pain in his forehead, pulse rather quicker, but tongue not furred. After this, he gradually recovered, without any particular symptom occurring, and without any other medical treatment.

It is not likely that, in either of these cases, extravasation, at least to any considerable degree,

gree, had taken place within the head, since in neither of them was there stertor, dilatation of the pupils, or insensibility. They may, therefore, I think, be considered as exhibiting the symptoms which attend simple concussion. I have related them, to shew the circumstances, upon which the reasoning that follows is grounded.

The opinions that prevail amongst surgeons respecting the treatment of concussion, are very different. Many late writers advise stimulating cordials, such as wine and volatile alkali, to be given; while others pursue a directly opposite conduct. Nor do they agree in the account of the symptoms, which they consider as depending on this species of injury. Most writers represent the subject, as if the deranged state of the brain, which is the immediate consequence of the shock, continued to the termination of the patient's illness or life; while, in the cases given by Mr. Pott, the symptoms appear to proceed more from the inflammation which ensues, than from the concussion.

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The whole train of symptoms following a concussion of the brain, may, I think, be properly divided into three stages. The *first* is, that state of insensibility and derangement of the bodily powers which immediately succeed the accident. While it lasts, the patient scarcely feels any injury that may be inflicted on him. His breathing is difficult, but in general without stertor; his pulse intermitting, and his extremities cold. But such a state cannot last long; it goes off gradually, and is succeeded by another, which I consider as the *second* stage of concussion. In this, the pulse and respiration become better, and though not regularly performed, are sufficient to maintain life, and to diffuse warmth over the extreme parts of the body. The feeling of the patient is now so far restored, that he is sensible if his skin be pinched; but he lies stupid, and inattentive to slight external impressions. As the effects of concussion diminish, he becomes capable of replying to questions put to him in a loud tone of voice, especially when they refer to his chief suffering at the time, as pain in the head, &c.; otherwise, he answers incoherently,

rently, and as if his attention was occupied by something else. As long as the stupor remains, the inflammation of the brain seems to be moderate; but as the former abates, the latter seldom fails to increase; and this constitutes the *third* stage, which is the most important of the series of effects proceeding from concussion.

These several stages vary considerably in their degree and duration; but more or less of each will be found to take place in every instance where the brain has been violently shaken. Whether they bear any certain proportion to each other or not, I do not know. Indeed this will depend upon such a variety of circumstances in the constitution, the injury, and the after-treatment, that it must be difficult to determine.

With regard to the treatment of concussion, it would appear, that in the first stage very little can be done; and perhaps, what little is done, had better be omitted, as the brain and nerves are probably insensible to any stimulants

mulants that can be employed. From a loose, and, I think, fallacious analogy between the insensibility in fainting, and that which occurs in concussion, the more powerful stimulants, such as wine, brandy, and volatile alkali, are commonly had recourse to, as soon as the patient can be got to swallow. The same reasoning which led to the employment of these remedies in the *first* stage, in order to recall sensibility, has given a kind of sanction to their repetition in the *second*, with a view to continue and increase it.

But here the practice becomes more pernicious, and less defensible. The circumstance of the brain having so far recovered its powers, as to carry on the animal functions in a degree sufficient to maintain life, is surely a strong argument that it will continue to do so, without the aid of means which probably tend to exhaust parts already weakened, by the violent action they induce.

And it seems probable that these stimulating liquors will aggravate that inflammation which
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must sooner or later ensue. The access of it, in the cases which I have related, is sufficiently evident; and its cure is to be effected by the common methods. The great benefit of evacuations was, in those cases, very evident. Indeed, it appears to me, that there is no complaint which requires such means to be more rigorously prosecuted, than an inflammation of the brain or its membranes. But as I design to relate some cases, with a view to elucidate the symptoms which attend that disease, I shall postpone any further remarks on this subject.

In addition to the reasoning which I have offered here, I would observe, that surgical books abound with cases in which suitable evacuations have been freely employed in concussion, with the best effects; while the advocates for a contrary practice have rested their arguments upon vague theory, and communicate no particulars of their success.

If the foregoing cases exhibit the genuine marks of concussion, the administration of
cordial

cordial medicines, which has been so much recommended, appears to be very ill adapted to the relief of such an injury. In what case then does this treatment seem advisable?—The following, which is a case of simple concussion, and so violent in degree as soon to prove fatal, is related, that the reader may judge what conduct ought to be pursued in such circumstances.

C A S E XIV.

W. Thomas, about thirty years of age, fell from the top of a brew-house, a height of at least 80 feet. His hand being stretched out, first sustained the shock, by which the carpal bones were separated, and driven upwards, some before, and others behind the ends of the radius and ulna, the articular surfaces and periosteum being at the same time forced off the latter bones. I mention these particulars to shew the great violence of the fall. The man's head afterwards struck the ground, as appeared by a bruise on his face; but the cranium

nium was not injured. When brought to the hospital, he appeared almost deprived of life, his body being cold, and his pulse scarcely to be felt. The gentlemen then attending, put his feet into warm water, and gave him an opiate.

After this he gradually became warmer, and it was observed that there was not much dilatation of the pupils, and but little stertor in respiration. I saw the patient next morning, at which time his skin was very hot, and he perspired copiously. His breathing was repeated at regular intervals, but the expirations were made with unusual force. The pulse was extremely irregular, both in frequency and in strength; generally about 140 in a minute. His pupils were moderately contracted, his eye-brows drawn into a frown as if he suffered pain. When I spoke to him softly, he did not answer. I pinched his hand slightly, but he did not move; but when I repeated this a little harder, he drew it away with seeming vexation. He disliked that

that his eyes should be examined. When, by speaking loud, I roused him, and inquired if his head ached, he answered, Yes. I got him to swallow some opening medicine, which emptied his bowels; and four leeches were applied to his temples; but they extracted very little blood, and I thought his pulse countermanded any further evacuations.

In the afternoon, he appeared better. His pulse was more regular, and his skin of a more natural temperature; his pupils, however, were more contracted, and his sensibility increased. I tried the effect of giving him forty drops of tinct. opii, thinking it might diminish sensibility, and keep him quiet for some time, during which the vascular system (which seemed to be particularly deranged) might perhaps regain its powers. The opiate increased his disposition to sleep, and he appeared to suffer less pain; but in the evening, his pulse was more feeble and frequent, and his skin hotter, and quite wet with perspiration. Wine was now given to him, but without any apparent benefit; the powers and actions of life gradually diminished, and before morning he died.

On dissection, there appeared every mark denoting violent inflammation of the brain and pia mater, of short duration. The minute arteries of the pia mater were turgid with blood; in many places there was the appearance called blood-shot, which was also to be seen in the lining of the ventricles. Dark-coloured, and in some places, bloody, coagulable lymph filled all the recesses between the tunica arachnoidea and pia mater. On dividing the substance of the brain, all its vessels appeared as if injected with blood.

I am inclined to believe that the medical treatment of this patient did him neither much good nor harm. The means employed seem to have acted on him as on a person in health. The opening medicine rendered him cooler, and quieted a little the disturbed actions of the system. The opiate made him more still, and disposed him to sleep.

I leave it to practitioners to consider, whether cordials would have been of any service in this case. Would they not rather, by stimulating the nervous system, have increased

the disturbance of the sensorium, and, by exciting the heart and arteries, have tended to aggravate the inflammation of the brain?

It has hitherto been considered as a desirable object, to point out any marks by which we might distinguish between compression and concussion of the brain; but I believe no such criteria have yet been communicated to the public. I think, however, that these diseases may in general be distinguished. As far as my observation goes, the insensibility is much less in concussion, especially after a short time has elapsed. Patients in this case, though they seem reluctant to answer questions, yet complain much if their heads are moved; and in those instances where it was judged necessary to inspect the bone, I have generally found that they made great complaint during the operation. The pupils also are usually more contracted than in compression of the brain, the muscles of the limbs retain their natural state of tone, and respiration is performed with

little or no stertor*, though the pulse generally intermits in a very considerable degree. In the slighter cases of concussion, the sickness of the patient is often very great.

But, in cases of compression of the brain, circumstances, very much the reverse of those just related, take place; the sensibility is much diminished in proportion to the degree of the injury; from this cause also the pupils are dilated, and the limbs relaxed; the respiration is attended with stertor; and the pulse, as far as my observation extends, is subject to much less intermission.

SECTION V.

On Inflammation of the Pia Mater.

Although inflammation of the pia mater is too frequent a disease to need illustration by the relation of cases, yet I take the liberty of

* But the absence of stertor must not be relied on as a proof that there is no compression; for Morgagni relates dissections of apoplectic persons, where the effusion was considerable, yet no stertor had occurred; and I have seen cases where it took place only in a very slight degree.

relating

relating one, in order to recall to the remembrance of the experienced, the train of symptoms which are likely to occur in this complaint, and to impress the nature of them on the minds of students; when I shall afterwards offer those remarks which I have been able to make from my own opportunities of observation.

I am induced to take this subject into consideration, from a persuasion, that, if it were omitted, a considerable deficiency would appear in this Essay.

C A S E XV.

A man, between thirty and forty years of age, whose head had been crushed between a cart-wheel and the wall, was admitted into St. Bartholomew's Hospital, under the care of Mr. Pitts. The integuments of the cranium, and the upper edge of the temporal muscle, were both torn, and much bruised. The patient was sensible when received into the house. He was immediately bled, and took a purgative medicine. The next day he com-

plained of considerable pain in his head; upon which saline medicines, with antimony, were prescribed. On the third day he was worse; and on the fourth he became delirious and frantic; he frequently endeavoured to get out of bed, and struggled violently when prevented. I now, for the first time, saw the patient, by the desire of Mr. Pitts, who was gone out of town. The progress and symptoms of the complaint clearly shewed that it was an active inflammation of the pia mater. The patient was therefore bled largely, and a blistering-plaster applied over the greater part of his head. The next day he was quieter, and more disposed to coma; but when roused, he was still irrational and impatient. On the following day (the fifth), the coma had increased much; and as the bone was laid bare by the wound, it was thought right to expose it more extensively, in order to see if the state of it indicated the propriety of applying the trephine. I accordingly removed a little of the spongy temporal muscle, beneath which I found the pericranium naturally adherent. I also scraped the denuded bone, and found
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that it bled freely in every part. This circumstance contra-indicated any operation, and confirmed me in the opinion which I had formed of the disease, viz. that it consisted of active inflammation of the brain and its membranes. Two days after this the man died. On dissection, the dura mater was found every where naturally adherent; the pia mater was much inflamed, and a considerable quantity of turbid fluid was collected between these two membranes, and also in the ventricles of the brain*.

In the instance just given, of this very frequent disease, the distinct interval which occurred between the immediate consequences

* When the former part of this Essay was printed, I designed to have printed three cases in which inflammation of the pia mater proved fatal, in order to have shewn some varieties in the symptoms of that disease; but two of them have been omitted for the sake of brevity; in one of which the inflammation began on the third day after a small portion of the skull had been beaten in, though the depressed part was immediately elevated. This case has been alluded to in a former part of this Essay.

of the injury and the subsequent fatal inflammation, renders the nature of the case particularly clear. This, however, does not always happen; and when it does not, the inflammation is frequently confounded with the immediate effects of concussion.

The inflammation of the dura mater, which occasionally succeeds to injuries of the head, has been well described by Mr. Pott. Patients labouring under this complaint are feverish, have a constrictive pain in the head, but continue rational, and give a clear account of their symptoms, until matter forms, or inflammation of the internal parts ensues. This is what we might naturally expect from the structure of the dura mater, the manner in which it is supplied with blood, and its vessels having little connection with the brain. When the pia mater becomes inflamed, as the brain derives a considerable portion of its blood through the vessels of that membrane, the disease is instantly communicated to the cerebrum, and deranges its functions. This derangement varies in its nature and degree, accordingly as the

the inflammation of the pia mater is more or less violent; as it is confined to the surface, or extends to the internal parts; as it produces a greater or smaller secretion of fluid which compresses the brain; or as it is more or less blended with the effects of concussion. The state of the patient will vary considerably under these different circumstances. If the inflammation be violent and general, the patient will be irrational and disturbed, having his mind strongly affected by wrong ideas, and endeavouring to act in consequence of them. If the inflammation be moderate, and affect the surface only, he will be irrational, uneasy, restless, and perhaps endeavour to get out of bed, but without the violence of mania. Should a moderate inflammation be blended with the effects of concussion, he will have less appearance of irrationality, will lie pretty quiet, and inattentive to slight impressions, as appeared in the cases related.—I am not able to particularize every variety that may occur in the symptoms; but in all, there must be more or less derangement of the powers, both mental and corporal, depending upon the degree

degree of inflammation*.—The symptoms which chiefly characterize the complaint, are those of an increase of sensibility; the pupils of the eyes are contracted; the patient often withdraws his arm on being touched, and his pulse and tongue denote general as well as local inflammation. It seems of the utmost importance, that those means which in general cure inflammation, should be prosecuted very vigorously at the commencement of this complaint, since otherwise, although they may check, they will not overcome it. Large blood-lettings, brisk purging, and extensive counter-irritation by blisters, ought to be employed at the very commencement; for, if omitted, then the disease will become established, and the powers of the body will soon be too much sunk to admit of the same active treatment at a later period.

* An unusual infirmity of the bodily powers is sometimes observed, accompanied with tremors, low delirium, and exceedingly rapid pulse; yet, on dissection, a slight inflammatory appearance of the pia mater and brain is all that can be discovered. Such a state sometimes occurs after an abscess has formed in the brain.

I have

I have here represented the general effects of inflammation of the pia mater when it arises from previous violence. In other cases indeed, where it comes on, as it were, spontaneously, or without any powerfully exciting cause (in which case it generally falls under the care of the physician), it has appeared to have affected the brain but little, and to have been very slow in its progress, and inactive in its nature. In such cases it has produced a deposition between the tunica arachnoidea and the pia mater, or a collection of serum between the former membrane and the dura mater. Under these circumstances, I have learned that the rationality of the patient has been scarcely deranged. And as such a state of disease may occur after an accident, I have therefore thought it right to mention it in this place.

Cases of Disease of the Bone and Dura Mater.

The diseases of the cranium, and consequent affections of the dura mater, have been well described by some French and German surgeons.

surgeons*. But as they have not, I believe, been explained by English writers, I shall confirm the accounts which we have received of them, by additional cases; and afterwards offer some remarks on this subject.

CASE XVI.

A man, between thirty and forty years of age, was salivated for complaints in his head, supposed to be venereal. There were two tumours of the scalp; one a little before the coronal suture, and the other a little above the posterior superior angle of the left parietal bone. The man's health was greatly reduced by the course of medicine he had undergone, as well as by the disease, which had considerably increased during the use of mercury. The integuments covering the posterior tumour, had ulcerated; and a probe could be passed under them so as to discover a confi-

* Vide Monf. Louis' Memoire, in the fifth volume of the Mem. de l'Acad. de Chirurgie, and Haller's Disputationes Chirurgicæ.

derable

derable extent of bare and carious bone. The surgeon, under whose care he was admitted into the hospital, divided the integuments, and perforated the diseased bone, which was found separated from the dura mater. That membrane also had a very morbid appearance, being covered with a soft substance of a dirty reddish colour. On pressing down the dura mater with a probe, to see if it was detached to any extent, nearly a table-spoonful of healthy pus issued from beneath the bone, about an inch behind the part perforated. The surgeon thought this might be sufficient to relieve, and therefore deferred making another perforation. But the man, who had lain stupid, though not irrational, and had subfultus tendinum accompanied with great debility, grew shortly after delirious; in which state he continued about two days, when he became convulsed, and died.

On dissection, purulent matter was found on the dura mater beneath both the carious portions of bone. The membrane also, which
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was detached, was much thickened, so as in some degree to indent the surface of the brain. The pia mater was generally inflamed; and a larger quantity of fluid than usual was found in the ventricles.

C A S E XVII.

An old man was admitted into the hospital for a complaint of giddiness and pain in his head. Upon examination, a tumour was perceived over the left parietal bone, into which an incision was made, and a good deal of matter discharged. The pericranium was found to be detached for three inches in length, and two in breadth. In the middle of the bare bone, which seemed to be dead, and really was so, granulations of a healthy appearance had sprouted up. These arose from the dura mater, and had made their way through the bone. The patient's health, which was moderately good at the time of his admission into the hospital, gradually declined; and, after about six weeks, the pain in his head became particu-

particularly severe. From this time he became gradually comatose, took no food, and soon died.

On dissection, the dura mater, beneath the carious bone, was found detached, and had granulated. Much pus lay between the left hemisphere of the brain and the falx; and the whole of the dura mater covering the right hemisphere was lined with healthy pus, which adhered to its surface, and appeared to have been secreted by that membrane.

The cases of diseased bone which require perforation of the cranium, have not been sufficiently treated of by any English writer. Mr. Pott has, indeed, noticed the disease and death of portions of the skull, that succeed to contusions; but he has not sufficiently explained the affections of the membranes of the brain, which even these diseases sometimes occasion. The circumstance which seems particularly to have attracted his attention, is the inflammation and suppuration in the diploë, which proceed from injury done to the bone.

bone. The existence of that complaint, however, is easily known; for while there is a fixed pain in that part of the bone, there is no general inflammation, or but very little, of the dura mater. The disease continues, too, a much longer time without producing any seriously bad symptoms, than any disorder of the internal parts could do. When matter is formed in the diploë, the pericranium will certainly separate from the bone, and the external table of the skull will undoubtedly perish. In a case so clearly marked, the conduct to be pursued is obvious, which is, to remove a portion of the external table with the trephine, so as to discharge the matter collected in the diploë, without which no relief can be obtained. I have seen, in several cases where the operation was performed early, that the external table came away within the circle of the trephine, the matter was discharged from the medullary part of the bone, and the internal table remained sound and entire, covering the dura mater. Granulations soon arose, and the patients got well, with the exfoliation only of a portion of the outer table. The mischievous

chievous consequences of delaying the operation when once the disease is known, must be evident; for the matter collected within the bone, having no natural outlet, will press on every side, first gradually destroying the diploë, sometimes extending itself over almost the whole of the cranium, and at last occasioning the partial absorption of both tables, so that the skull after death shall be found perforated with a number of holes, like a piece of worm-eaten wood. These holes afford a discharge to the matter, which not only oozes out beneath the pericranium, but also insinuates itself between the skull and dura mater; till at length the patient sinks, worn out by the irritation and fever which this painful and extensive disease creates; unless, as it sometimes happens, he is previously destroyed by inflammation attacking the membranes of the brain.

Suppuration of the diploë, and the death of a portion of the bone, are the common effects of injury done to the cranium; and such a morbid state may indeed occur at some di-

stance of time from the receipt of the injury. But the disease which the cases represent, generally arises without an obvious cause. An affection of the dura mater is almost the necessary consequence of such a disease in the bone. In syphilis it probably takes place later than in any other instance; for that disorder attacks the outside of the skull, which it gradually destroys; the inner table and the dura mater remain sound till the last. But when, as in the complaint I am now considering, the whole bone is involved in disease, we can no more expect that the dura mater should remain unaffected within, than that the pericranium should continue sound and attached without; for that membrane may be regarded as the periosteum to the internal table of the skull. It is well known that, in general, the dura mater separates, and becomes thickened from a deposition and subsequent organization of coagulable lymph between its layers. This thickening is sometimes considerable, so as to form a tumour which causes an indentation in the cerebrum; as happened in a very remarkable degree in the case of the

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Sieur le Gallois, related by M. Louis*. Sometimes the dura mater secretes pus, which being confined within the cranium, produces inflammation of the brain, &c. At others, granulations arise from the irritated membrane, and, making their way through the bone, form those tumours so well described in the Memoir just referred to. This took place in one of the cases I have related; and is a remarkable instance of the power which granulations possess of removing bone. The disease, however, does not confine itself to the part first attacked; for if the irritated state of the dura mater be not appeased, thickenings will take place in other parts of that membrane; or the inflammation becoming more extended, suppuration may be produced even over the opposite hemisphere of the brain, as happened in both the cases which I have related.

I do not mean to say that in every case of diseased cranium, even where both tables of the skull are equally affected, the perforation of the

* See Mem. de l'Acad. de Chirurg. tom. V. It also took place more slightly in one of the cases which I have related.

bone is indispensably required. I know it often happens that the bone exfoliates, without any bad effects having been produced.

But surely no surgeon, who perceives the danger of delay, would hesitate to remove all the dead portion of bone, if symptoms denoting general irritation of the dura mater take place. The best event that can be expected, is, that the bone will at length exfoliate without much pain to the patient, or injury to his constitution. By removing the dead bone, and giving an early and free discharge to any matter collected beneath it, the irritation which it occasioned will be taken away, the diseased state of the dura mater will gradually subside, and healthy granulations arise from its surface; nor will any farther disease occur in other parts of that membrane. M. Louis tells us, at the conclusion of the Memoir already quoted, in what manner experience had taught him to treat fungi of the dura mater. He says that “the whole of
“the tumour should be exposed, which cannot happen till the bony circle which con-
“ceals

“ceals its basis, is removed; and that afterwards means should be employed to destroy the fleshy excrescence*.” Although the destruction of the fungus might be proper for the sake of expedition, and although it can perhaps be attended with no harm, by whatever means effected; yet it may not be necessary. Like other animal fungi, it will probably cease to grow, and soon disappear, when the irritation which occasioned it has been removed.

In cases of tumours forming within the skull, it is of consequence to determine from what part they proceed. In general, they will be found to spring from the dura mater, and to be the effect of disease in that membrane, induced and kept up by irritation. Surgeons have endeavoured either to reduce them by caustic; to restrain them by pressure; or to take them off by ligature or the knife:

* The excellent effects of such bold but judicious practice are well shewn in a case related in the 9th Paper of Haller's *Disputationes Chirurgicæ*, Vol. I. in which a piece of diseased bone, six inches and a half in circumference, was removed.

and the excrescences have either ceased or continued to grow, according as the irritation which gave rise to them has been removed or not. If the former happened, the surgeon has sometimes attributed undeserved merit to the means he had employed for the cure.

Those tumours which come from *within* the dura mater, may possibly differ in their kind in different diseases; but all that I have ever seen were of the same nature; and those have been described in a former part of this Essay.

What I have written must appear very deficient, if it be considered as regarding the effects of injuries of the head in general. But my intention has been only to endeavour to illustrate particular points of practice, by a relation of cases selected from a considerable number of each kind.

A
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SINCE my former publication on this subject, I have met with several interesting cases, which I shall now relate, together with the conclusions drawn from them, in the order in which they occurred.—It may not be improper, however, previously to mention, that George Tucker, the person on whom I first tried this method of discharging the matter without leaving a permanent opening in the cyst, and whose body I have, not long ago, had an opportunity of examining, never had the least return of his complaint. After quitting the hospital, he travelled over a considerable part of England

for two years, during which time he lived very irregularly. When I next saw him, he had come up from Portsmouth to get into St. Bartholomew's Hospital, on account of an ulcer on the prepuce, accompanied with erysipelatous inflammation and sloughing; for which he was admitted, and soon got well. In relating his case, I have said that he had a constant cough, and probably diseased lungs. This opinion has since been verified; for, about a year and a half ago, he was seized with hæmoptysis, of which he died. When I opened the body in order to inspect the seat of his former complaint, I found some difficulty in raising the peritonæum from the psoas and quadrati lumborum muscles, owing to a thickened state of the cellular substance connecting these parts; but the alteration was so inconsiderable, that I believe it might have passed without notice in the ordinary dissection of the body.—The spine had never been in the least diseased.

CASE I.

The next case which I had occasion to see after those already related, was that of Charles White, a patient of Mr. Blicke's, at St. Bartholomew's Hospital. This man, who was thirty-six years of age, and not unhealthy, had a lumbar abscess, which presented beneath the fascia of the thigh, and which there was no reason to suppose connected with any disease of the spine. From this abscess I discharged, by puncture, twenty-four ounces of healthy pus, and healed the orifice. The patient suffered some weakness and derangement of health; but they were not considerable. The operation was repeated every fortnight; and, by the fifth time of performing it, the quantity had decreased to four ounces. At the end of another fortnight, I made the opening to discharge the matter, larger than common, and did not attempt to unite it, but directed a poultice to be applied to the thigh, and the patient to be kept in bed. No perceptible derangement in his health took

place in consequence of this. The lips of the wound granulated, which, I think, is always a good sign; the fascia seemed to adhere to the parts beneath; and in the course of a month he was thought well enough to leave the hospital, although there was still some matter discharged from the wound. In a few weeks more, the part was entirely healed; nor had he afterwards any return of the complaint.

C A S E II.

— Harris, thirty-five years of age, had a considerable collection of matter beneath the integuments of the abdomen, forming a moderately prominent tumour, about three inches in diameter, and seated just above Poupart's ligament. The patient had suffered a great deal from pain in his loins; and the motion of the thigh had been much impeded, but was now tolerably free. Indeed there was no doubt that the matter had been originally formed in the loins; from whence it was violently impelled, so as to elevate the prominent integuments of the abdomen, whenever he coughed.

coughed.—By permission of Mr. Long, under whose care he was admitted into the hospital, I punctured the tumour, and discharged about 24 ounces of pus, mixed with some flakes of a curd-like substance. The wound healed readily, and no considerable alteration of his health ensued, though he found himself weaker for some days after the operation.—At the end of a fortnight, I made a second puncture, and let out between six and seven ounces of a turbid fluid. He now thought himself so much better than after the first evacuation, that he went out of the hospital; but returned again at the expiration of a fortnight, when, by a third puncture, six ounces of purulent matter were discharged; and, after another week, four ounces more were let out. A caustic was now applied to his loins, and four or five peas used to keep the ulcer open; from which time no matter could be discovered in the abscess during the six weeks that he remained in the hospital.

About eighteen months after this, he was admitted into the hospital on account of a fever
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and fore throat ; and it appeared he had never experienced any farther complaint in his loins.

This case, I think, is very interesting, inasmuch as it contributes to prove that the cavity of a lumbar abscess may be entirely obliterated without the cyst undergoing any of those changes which generally take place when it is laid open.

C A S E III.

William Hanks, when about twenty-eight years of age, had a collection of matter formed in his loins, which descended beneath Poupart's ligament, and elevated the fascia of the thigh. The formation of this matter had not been attended with pain ; neither were the motions of the thigh impeded during its collection. The elevated portion of the fascia was about three inches in length, and two in breadth ; and the impulse communicated to it from the loins, on coughing, was distinct, though not very forcible.—I punctured the abscess, and discharged

discharged twelve ounces of pus, in which there were some flakes of coagulum. The wound healed speedily, and the patient not only suffered no inconvenience, but even found himself better than before the operation.—After three weeks' time, the matter which was collected gave so little prominence to the fascia, that, when I punctured it, I was apprehensive of injuring the subjacent parts; and not more than between five and six ounces of pus flowed from the orifice on this occasion.—As the quantity of matter contained in the abscess at first was small when compared with that in many other cases which terminated well, as the patient also was young, and apparently capable of sustaining the degree of irritation likely to ensue, I thought there was no great risque in leaving the orifice unclosed. Accordingly, a poultice was applied over the part; and I hoped that, by thus endeavouring as much as possible to lessen inflammation about the wound, I might prevent any considerable degree of it from taking place in the cyst. For some time the fascia felt sore, and was painful when the integuments were pressed;

pressed; but this tenderness abated in about ten days; the discharge also lessened, and there appeared ground to hope that the patient would soon get well. He was now attacked with pain in his loins, accompanied by fever: the discharge also increased, and had a fetid smell. These symptoms, however, gradually abated, but left the patient greatly reduced in strength. After a short interval, he again experienced a similar relapse and recovery, by which his weakness was still farther increased. He had been occasionally troubled with cough, which now became very constant, but without any expectoration; and I observed that he drew in very little air when he inspired.—As the abscess discharged largely, and the strength of his constitution was rather declining, I made a large issue in the integuments of his loins, with a view to lessen the internal disease. This seemed to be of great service; for the pain of his loins went off, and the discharge from the abscess abated gradually, and at last became inconsiderable. Still, however, he did not recover his health; and the country air was now recommended by Dr. Latham, who

who had prescribed for him, during his illness, those medicines which his disorder seemed to require. He accordingly left the hospital, and, at the end of ten months, returned to town; when the wound in his thigh still continued to discharge a small quantity of matter. Afterwards, a thickening of the integuments on the front of the thigh took place; and two or three small ulcers formed there, which did not readily heal, but were sometimes in a better and sometimes in a worse state.—I saw him occasionally, for two years, during which time he had tried the effect of sea-bathing. His health, however, was not good, though it did not appear to me to suffer from the remains of the abscess, which neither occasioned pain nor hindered his walking. At last, his strength declining, he was again admitted into the hospital, under Dr. Latham's care. He was now much troubled with cough, and hectic fever; and, under the fascia of the other thigh, opposite to the dorsum of the ilium, a fresh abscess appeared, which, however, had no communication with the abdomen. The powers of his constitution were

now evidently broken, and he gradually sunk, and died.

Being greatly hurried for time during the only opportunity I had of inspecting the body, my examination of it was very cursory. I can, therefore, only say that both lungs were irregularly and generally indurated; that the cavity of the original abscess still remained open, but was contracted into a narrow fistula leading from the thigh to the middle of the psoas muscle. There was another large abscess on the opposite psoas muscle, which had not yet descended to the thigh, where, as has been already mentioned, there was also an abscess of considerable magnitude, but unconnected with this in the loins. The lumbar vertebræ were perfectly sound.

That the death of this man was not owing to the original abscess in the loins, is to me very obvious. That abscess did, indeed, for a considerable time, greatly disturb his constitution; but it afterwards became indolent, and acquired a state incapable of exciting irritation.

tion. The derangement of health which he suffered, was, I think, uncommon; and the disposition which different parts had to form matter, was also unusually great.

C A S E IV.

Having unfortunately lost the minutes which I took of the next case that occurred in the hospital, I can only give such a general account of it as my memory supplies. The subject of it, Doods King, who was under the care of Mr. Blicke, was about thirty years of age, and of a very sickly aspect. The abscess presented beneath Poupart's ligament; it contained at first about 20 ounces of curdly matter, and was punctured four times, with the usual progressive reduction in the quantity of matter discharged: but before the fifth time of opening, one of the punctured places ulcerated. There was indeed, from the beginning, in this case, a great disposition in the skin to inflame and ulcerate, and it was with difficulty I could heal the orifices made to let the matter out. As soon as the cavity

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had

had thus become open, a poultice was applied to the part, and confinement to bed strictly enjoined. The patient became somewhat weaker, but no fever ensued. I did not suffer him to go about, however, for a long time, lest the motion of the parts should induce inflammation. The abscess at last became perfectly indolent itself, and un-irritating to the constitution; but it did not shew much disposition to heal.—He was discharged in this state, and promised to apply again if his complaint became troublesome. I saw him about a month after his dismissal, when he mentioned a design of going into the country; since which I have not heard of him.

C A S E V.

A poor girl, nineteen years of age, whose spine was greatly distorted from disease of the bodies of the vertebræ, had a collection of matter formed in her back, which made its way along the right psoas muscle, and now distended the fascia of the thigh so much, as to occasion a redness of the integuments, and a dif-

a disposition in them to ulcerate. She was very thin, and of a delicate appearance; but her appetite was good, and her pulse, though frequent, was regular, and moderately strong. Issues were made in the integuments on each side of the curvature in the spine; and the abscess being punctured, two quarts of matter were discharged from it. At the end of a fortnight, I let out another quart, of a serous fluid rendered turbid by pus. After a like interval, fourteen ounces, and again ten ounces, of a similar fluid, were evacuated. During all this time she suffered no derangement in her health; on the contrary, both her appetite and strength were increased; a convincing proof that it is not the quantity of matter discharged, but the irritation which patients undergo in these cases, that exhausts their strength. Indeed, whoever reflects upon the great loss of nutritive matter which is often sustained with little injury by delicate females, where the contents of a diseased ovarium are frequently drawn off, will readily admit this conclusion.

The patient now became rather feverish, her skin being hot and dry, and she was thirsty and restless: at the end of the fortnight, the fascia of the thigh was so little elevated, that it was difficult to puncture it, and six ounces of matter only were discharged. During the next fortnight, her health improved, and she daily went out into the air upon crutches, which the deformity of her spine had long obliged her to use. I now wished her to return home, and to come to the hospital every fortnight or three weeks, as she might find it necessary. Before her dismissal, however, I once more punctured the fascia, and let out six ounces of fluid. This was done on Saturday; and when I came to the hospital on Monday, I was not a little surprised to find the tumour in the thigh as large and tense as when I first saw it. The integuments were also affected with considerable erysipelatous inflammation; her pulse was a hundred and sixty, and very irregular; her breathing quick, and so extremely difficult as to indicate some uncommon affection of the parts concerned in respiration; her face, too,

* expressed

expressed the greatest disquiet and alarm: All the account I could obtain from the patient was, that something had burst within her during the preceding night.—She did not continue long in this distressful state, but died before I came to the hospital next day.

On examining the body, I found a great quantity of healthy pus beneath the fascia of the thigh. I then traced the channel of the lumbar abscess (which was about an inch in diameter) up to the superior part of the right *crus* of the diaphragm. I could not pursue it farther without dividing that muscle; but I passed my finger through an opening in the diaphragm, and found that I could introduce it between the processes of some of the dorsal vertebræ (which were carious and deficient), so as to touch the medulla spinalis. I now thought it right to open the thorax; and having removed the lungs, I discovered a large abscess which had formed beneath the pleura on the left side of the spine, and which still contained some matter. From this also, I could pass my finger through the spinal canal

to the abscess on the opposite side ; the transverse processes of the vertebræ on both sides being carious, and in part deficient.

It was now clear, that the abscess from which I had discharged the matter by puncture, extended from the dorsal vertebræ to the thigh ; but that a large abscess had also formed on the opposite side beneath the pleura, which forced its way through the carious spine, and again filled the cavity of the primary one. But why the mere bursting of this second abscess, in the manner described, should have occasioned such extraordinary derangement of the system, and especially such difficult respiration, is not so easily explained.

C A S E VI.

James White, aged twenty-five years, came from Essex to be admitted into St. Bartholomew's Hospital, on account of a lumbar abscess. He had suffered much from pain of his loins for twelve months ; and for some time past had experienced a difficulty in lifting up his right thigh. There was a curvature in the
dorsal

dorsal vertebræ; but that, he informed me, was an old complaint. Yet, from the general appearance of the man, from the difficulty he had in moving the upper part of the trunk upon the lumbar vertebræ, and from the caution with which he attempted this motion, I could not but suspect a disease of the spine. Issues were therefore made in the loins; and on the 25th of June, I let out two quarts of purulent fluid from beneath the fascia of the thigh. He had less pain in his back after the operation; and though he was teased with a cough, his strength did not suffer any diminution.—On July 7th, I discharged from the abscess fourteen ounces more, of a turbid brownish fluid. On the 17th, though the tumour in the thigh was inconsiderable, yet the part first punctured was elevated and inflamed. It seemed that the puncture in the integuments had healed, while that in the fascia had not united firmly, but had suffered the matter to pass through it, so as to elevate the skin. To remedy this, which threatened to lay open the cavity of the abscess, I was obliged to puncture it in an-

other place; and eight ounces of fluid were discharged. The patient was now in much better health than he had been for more than a year, and was able to lift up his thigh without pain. I therefore set him to exercise the muscles in the neighbourhood of the disease, thinking that if the exertion did not produce irritation, it might answer a good purpose. With this view, he stood upon the leg of the sound side, and alternately lifted up and let fall the other, until he was somewhat fatigued. By frequent repetition of this exercise, the muscles of the diseased side acquired considerable strength; and in a little time he felt himself (to use his own expression) "able to go to plough."

The fascia of the thigh was punctured every fortnight for some time, and afterwards every three weeks. When he had been nearly three months in the hospital, he became tired of the confinement, and feeling himself strong, was very solicitous to have the abscess opened, and suffered to discharge itself. The disease of the spine made me unwilling to comply with his desire; and I sent him into the country for
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three weeks, that he might ascertain, by the journey, whether he was as strong as he supposed; thinking that if he bore it without fatigue, it might be of service to him. At the same time, I gave him strict injunctions not to exert himself if his loins or thigh became painful; and, in that case, to return again by the first conveyance. It was five weeks, however, before he came back; when I found that the abscess had inflamed, and burst, about twenty days after he left town; in consequence of which he became so ill, that he could not bear removal. He was now in a most wretched condition, being scarcely able to turn in bed, from the weak and painful state of his loins; his pulse was rapid, and his skin hot, and he had occasional fits of chilliness succeeded by sweating. He became considerably better, however, and continued so for some time, in consequence of the attention paid to him in the hospital; but his health again declined; and after several relapses, with intervals of temporary amendment, he at last sunk, and died at the end of three months from his re-admission.

With

With a view to lessen the excessive irritation which prevailed in the cyst after the abscess had become open, I tried to inject a solution of opium, but could not force it above Poupart's ligament; though I think that the quantity which was injected, and which was retained for some time, proved of service in this respect. The only way, I believe, in which injections could be applied to the whole extent of the sac, would be, by making an opening immediately below Poupart's ligament, and introducing to the upper part of the abscess a piece of hollow bougie, or some similar canula, through which the liquid might be pushed by means of a syringe. But whether injections of this or any other kind would prove of sufficient benefit to vindicate such an attempt, my experience does not enable me to say.

On opening the body after death, I found that the abscess extended upwards to some diseased vertebræ. The diseased bone, however, did not immediately come into view on lifting up the peritonæum; for the tendinous

expan-

expansion which covers the bodies of the vertebræ, was still entire, and formed a kind of cyst distended with matter. When this was opened, it was found to contain pus, together with the fragments of three of the bodies of the lumbar vertebræ; there being ten or twelve detached pieces of bone lying upon the medulla spinalis, and surrounded with matter. This was evidently a peculiar disease of the spine, which neither caustics nor any other remedy could alter. It greatly resembled that diseased state which sometimes occurs in the carpus and tarsus, in which the small bones composing these parts are broken down, and lie confined in a ligamentous capsule, surrounded with matter. If the dead portions of the vertebræ had not been thus confined, they might have had some chance of removal; but under the circumstances already noticed, it is most probable that they would remain, and act as extraneous bodies, exciting irritation, and increasing the disease.

CASE

C A S E VII.

April, 1795.—Robert May, aged thirty, was about three years ago attacked with severe pain in his loins, which has continued in a greater or less degree since that time. In the beginning of the winter the pain became very severe, during the continuance of which he was unable to lift up his thigh; and soon after, he, for the first time, remarked a swelling in his groin. The pain then gradually abated, and he recovered the power of moving his thigh with tolerable freedom.—About three months ago, he discovered another swelling beneath the glutæus muscle of the same side. The swelling on the front of the thigh appeared large and spherical, and the matter was forcibly impelled from his loins whenever he coughed. The patient, who was of a pale complexion, with slender feeble muscles, had also considerable difficulty in performing the natural motions of the spine; from which circumstances, as well as from the long continuance of the disease, it seemed

seemed very probable that the vertebræ were affected.

The first time I punctured the abscess, about forty ounces of thin serous pus, mixed with some coagula, were evacuated. Three days after the operation, he had much pain in his back, on which account issues were made there, and were attended with relief. The abscess was punctured six times, at intervals of a fortnight, till at last the quantity of matter discharged did not exceed five ounces. His health during this time became much better; but the repeated wounds made by the lancet produced a considerable degree of enlargement in the lymphatic glands on the front of the thigh. This indeed had occurred to me in other cases, but never in so great a degree. One of the largest of the glands suppurated and ulcerated; and the general tumour was so great, as to preclude any farther attempt to puncture the fascia. I was therefore obliged to have recourse to other means, from one of which I experienced much advantage. Having applied leeches and
aqua

aqua lithargyri acetati to the tumour, without any effect, I was induced to try emetics, one of which, consisting of half a drachm of vitriolated zinc and one grain of vitriolated copper, the patient took twice a week. The use of these was followed by a great abatement in the swelling of the glands; and no fluid was collected in the abscess for more than six weeks, although, during that time, these medicines were gradually left off.

As I could now do no more for the patient, and thought that he would recover his health sooner out of the house, he was made an out-patient. In little more than a fortnight, however, he returned. A new inflammation had attacked his loins, where, as it appeared, the disease had not abated sufficiently to allow of much exertion in exercise. He was again admitted into the hospital, in hopes that this attack might subside during a state of rest. Very unfortunately, however, the ulcerated gland partook of the general inflammation, and the sore enlarged. A poultice was now applied over the front of the thigh; but on the
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the fourth day after his re-admission, the ulceration extended into the cavity of the abscess; which circumstance was known by the quantity of serous discharge that followed on the removal of the poultice; nearly a tea-cup-full of this kind of fluid came away daily.

Although his sufferings were not immediately aggravated by the abscess being thus laid open, yet the parts soon acquired that state which is usually found to take place in lumbar abscesses, especially when connected with a disease of the spine. The discharge became profuse, thin, and fetid. He could scarcely move himself in bed, and felt, he said, as if his back was broken. His appetite entirely forsook him, and his nights were passed without rest. From this state I certainly expected that he never would recover; yet, after lingering in it for more than two months, a change for the better took place. The sides of the opening granulated, and both the quantity and fetor of the discharge abated. Some degree of appetite again returned, and he acquired sufficient strength to walk about the ward. The weather

ther was at this time warm; and as he had an opportunity of going to the sea-side, I encouraged him to do so. His complaint, however, did not get any better there; on the contrary, he returned weaker than he went, with the addition of a considerable curvature of the spine about the lumbar vertebræ. His illness now seemed to be kept up rather by the disease of the vertebræ than by the peculiar state of the abscess.—Issues were made in his loins, and confinement to bed enjoined. Under this plan, his health, for a short time, improved; but the abscess continued to discharge profusely, and he afterwards became hectic, and died. His body was removed from the hospital before I had an opportunity of examining the spine.—I have, in other cases, seen people recover where the spine has been much diseased, under similar treatment. It seems to be very essential to preserve the diseased bone as free from motion as possible, and to keep up a considerable counter-irritation by issues.

CASE

C A S E VIII.

Elizabeth Smyth, aged twenty-seven, had a lumbar abscess, which presented beneath the fascia of the thigh. The previous symptoms rendered the nature of the complaint indisputable; and as she not only shewed evident marks of a scrofulous habit, but also felt considerable inability in moving the spine, there was great reason to suspect that the abscess originated from a disease in the bone. She was likewise troubled with cough, and drew in very little air when she inspired. Her appetite, too, was often deficient, and her bowels frequently disordered. It may also be added, that her brother, who greatly resembled her, was at this time a patient in the hospital, under Mr. Long, on account of a scrofulous disease of the spine, which had occasioned an affection of the medulla spinalis. When all these circumstances were taken into account, she certainly appeared a subject by no means capable of sustaining the irritation and disorder which the bursting of a lumbar abscess might

be expected to produce. I therefore punctured the abscess immediately, and discharged from it twenty ounces of flaky matter: and having healed the wound, I gave her emetics of vitriolated zinc and copper, and afterwards of ipecacuanha, twice or three times a week, for six weeks. At the end of this time, there was so little matter in the abscess, that I thought it too small to be punctured with safety; and as her health was too infirm to admit of the emetics being continued, I tried to produce absorption of the remaining matter, by passing the electric fluid through the abscess. Very small electric shocks* were accordingly sent from different parts by the side of the lumbar vertebræ, down to the groin, and upper part of the affected thigh;

* These small shocks, which, for the sake of distinction, I shall call electric vibrations (a term, I believe, generally applied to them), were made by discharging a small jar, the coated surface of which did not exceed fourteen square inches: and by placing the ball of the electrometer at a small distance from the conductor, generally about a quarter of an inch, one of the discharging rods was moved about on the upper part of the thigh, and the other on the loins, so that the electric fluid might pass through the abscess.

and, under this treatment, the contents of the abscess soon disappeared, nor did any farther collection of matter take place during the time of her remaining in the house, which was nearly two months. The electricity also brought on the menstrual discharge, which for a long time had been very irregular; and her general health was greatly improved before she left the hospital*.

C A S E IX.

Elizabeth Hart, about thirty years of age, had suffered greatly from pain in her loins, for ten months. During that time, matter had formed, and made its way down beneath Poupert's ligament, in such quantity as considerably to distend the fascia of the thigh. She was much reduced in strength, and in the appearance of health, by this complaint; but as her constitution was good, and she could move the spine with facility, there was no reason to suspect any disease of the bone.

* I have lately heard, that the abscess has not appeared again, though a year has since elapsed; but the pain in her loins, has (as might be expected) recurred.

I punctured the abscess, and discharged two quarts of very healthy pus, ordering her occasional emetics after the orifice had closed. She could not continue them regularly, however; as, during their use, her bowels became disordered, and she lost her appetite and strength. The accumulation of matter was, notwithstanding, evidently delayed by them; for when, at the end of three weeks, I next punctured the abscess, only one quart of ferrous fluid was evacuated. After the space of a month had elapsed, another quart was discharged. During this time she had taken emetics occasionally; but her health was far from good, and the pain in her loins was still considerable.—I had now witnessed the beneficial effects of electricity in the case of the last patient, and resolved upon trying it here. It was accordingly repeated three times a week, for three weeks. At first, a small collection of fluid in the abscess was perceptible; but this was gradually absorbed; and by the end of the third week, there was no longer any pain in her loins, her health was greatly improved, and she was able to walk about, without

out the least appearance of her former complaint. She was therefore discharged from the house; but came once a week, for some time, to be electrified*.

The two last cases point out to notice a remedy that is likely to be of much advantage in the future treatment of lumbar abscess. My experience of it, however, has not yet enabled me to determine how far it may be *generally* beneficial. In one instance where I employed it after the abscess had been once punctured, it kept the matter from collecting for a long time; but the patient growing tired of the confinement, and apprehensive lest the lancet should be again employed, left the hospital without my knowledge.—Of another, and somewhat analogous disease, in which it was tried, though not with complete success, I shall here relate the particulars; first remarking, that all the observations which I have made on electricity applied to diseased parts,

* This patient remains at present in perfect health; nor is there any reason to expect a relapse.

lead me to conclude, that it acts as a stimulus, which has the peculiar effect of accelerating that process which happens to be going on at the time.—Thus, in some states of inflammation, it hastens suppuration, whilst in others it promotes dispersion. We should therefore always endeavour, previous to the use of this remedy, to bring the tumour or abscess into that state in which its progress is stopped, and in which, perhaps, it is rather inclined to recede; and by this rule I have been guided in the application of this remedy to lumbar abscesses.

I have also been attentive to proportion the number and strength of the vibrations to the effect which they appeared to produce on the abscess: their operation seemed to be most beneficial when they occasioned a kind of irritation or slight uneasiness in the part for a short time after their application. But if this sensation amounted to pain, or if it was of too long continuance, I then supposed that the stimulus had been employed in too great a degree.

CASE

C A S E X.

Israel Brooks, aged twenty-five, about two years ago, was first seized with violent pain in his loins, which prevented him from either riding or walking for some time. About three months afterwards, he had the rheumatism in the joint of one of his fingers, which shifted to his wrist, where it produced a thickening and disease of that part; and at present, all the carpal bones are evidently diseased, and displaced. This disease also attacked his left knee, where it occasioned an enlargement of the joint, that still continues. Two months after this, he discovered a swelling beneath the glutæus muscle, which has gradually increased; and since that time the pain in his loins has become much less severe, but a sensation of great weakness remains. This abscess was shewn to me at the hospital, as an instance of a remarkably large one; and there was no doubt but that it contained between two and three quarts of matter. There was also a prominence of the fascia on the front of the

I 4 thigh

thigh below Poupart's ligament, accompanied with evident fluctuation. The several gentlemen who examined this latter tumour, thought they could perceive an impulse given to it from within, whenever the patient coughed; whence it was supposed to have its rise from a lumbar abscess: but whether the abscess under the glutæus muscle communicated with the loins or not, we were unable to determine, as no such impulse could be felt in it.

I gave the patient emetics of vitriolated zinc and copper; and kept up an eruption of pimples on the skin covering the abscess, by rubbing it with a strong solution of tartarised antimony. Gentle electric vibrations were also daily passed from the loins through the front of the thigh, and also through the glutæal abscess. By this treatment, continued for two months, the tumour was very much reduced in size; that is, as far as could be judged of by the eye; for its situation prevented any accurate measurement of it. In spite of our endeavours, however, the patient's health had declined since his admission

mission into the hospital; and in proportion as he lost strength, his other local complaints became worse.—As it was now summer-time, and he had an opportunity of going to the sea, which had formerly been of service to him, I punctured the glutæal abscess without loss of time, let out three pints of healthy pus, and then healed the opening. His weakness increased considerably after this discharge, and all his other complaints were much aggravated. The electricity was still persevered in; and at the end of three weeks, the quantity of matter in the abscess was very small; I cannot suppose it was more than eight ounces.—I very much wished to have had an opportunity of making fresh punctures in this case; but the state of the patient's health obliged me, however reluctantly, to discharge him from the hospital.

I have always found that abscesses, evacuated in this manner, filled again to one half or two thirds of their original quantity in the space of a fortnight: so that here also, the beneficial

neficial effects of electricity are, in my opinion, sufficiently manifest.

These are all the cases of lumbar abscesses that I have had the treatment of since my former publication on this subject. There are, however, some circumstances in two others that I have seen, which I think deserve attention, and which I shall therefore briefly relate.

C A S E X I.

Catharine Vallance, nineteen years old, of a healthy appearance, but having a considerable inclination of her body forwards, from a former disease of the dorsal vertebræ, had, for twelve months before I first saw her, laboured under severe pain of her loins, accompanied with fever. There was at that time a large lumbar abscess, the matter of which had descended to the upper part of the thigh, where it distended the integuments, so as to render them prominent and thin. A surgeon pricked this
tumour

tumour with a lancet, and let out more than a pint of very healthy pus ; by which the bulk of the swelling was scarcely diminished : but as no more matter would flow, a piece of sticking-plaster was applied over the orifice. Four days afterwards, another surgeon, observing that the integuments were inflamed, and the punctured part much disposed to ulcerate, made another aperture, at some distance from the former, and discharged three pints of good pus ; which completely emptied the cavity. The last puncture being attentively closed, healed readily ; and the first lost its disposition to ulcerate. The young woman continued perfectly in health for ten days, when some little distention of the abscess again occurring, the first puncture ulcerated ; in consequence of which the collected matter made its way out, and left a permanent opening into the cavity. Considerable fever now came on, the patient's pulse was rapid, her tongue white, and her skin hot and dry ; but these symptoms abated after a short time, and she again recovered her former state of health ; the abscess not falling into any secondary state
of

of disease after the inflammation went off; nor did any hectic fever take place after the first derangement of the constitution had subsided.

Another abscess now presented itself, in the same situation, on the opposite side. As soon as this had acquired sufficient prominence to give security to the parts beneath, it was punctured; twelve ounces of healthy pus were let out, and the orifice was closed. When the matter collected again, the wound, made to discharge it, was suffered to remain open. The inflammation which took place in the cyst in consequence of this, was very slight, and hardly affected the constitution: the parts soon became indolent, discharging but little matter, and both the abscesses healed gradually.

It is now three years since this case occurred; and I have lately seen the patient, who has experienced no inconvenience from the complaint since that period.

CASE

C A S E X I L

A young woman had a lumbar abscess, presenting in the upper part of the thigh, from which a surgeon discharged, by puncture, nearly a quart of matter, and healed the opening. At the expiration of a fortnight, a second puncture was made, and twelve ounces of matter let out. The last orifice was closed like the first, but after a few days it ulcerated, and the cavity of the abscess became exposed. The patient now growing very ill, was admitted into St. Bartholomew's Hospital. Her pulse was quick, but not deficient in strength; her tongue white, and her skin hot and dry: the discharge from the abscess was not great, but the pain of her loins was very severe. A large poultice was applied to the thigh; and the common saline mixture, with small doses of antimonials, was given. In the course of a week, a considerable change took place; her pulse, though still quick, was rather feeble; her tongue moist, and not furred; and she
had

had frequent perspirations without any evident cause : the pain in her loins abated considerably, and the discharge from the abscess became copious, thin, and fetid. She now began to take the Peruvian bark, and in the space of a month gradually recovered from this state of debility. Having acquired strength enough to sit up, and to walk a little about the ward, she one day imprudently went into the air, and walked until she was much fatigued. The consequences of this were, a return of the pain in her loins, with quickness and hardness of her pulse, white tongue, and hot and dry skin. As the pain and fever went off, they were succeeded by an increased discharge from the abscess, and irregular perspirations, which gradually abating, the abscess at length became indolent, and no longer affected the constitution. Warned by her former experience, she now took exercise very cautiously ; and when she found she could bear motion without exciting irritation in the abscess, she went into the country, where she regained her health ; the abscess healed,

healed, and she has since continued perfectly well.

When a permanent opening is made in a lumbar abscess, the part generally falls into a morbid state, and this is accompanied by a sympathetic affection of the constitution, corresponding in its nature with the local complaint. In the first of the two cases just now related, both the local and constitutional disease were of a more purely inflammatory kind, than in any other that I had ever seen; nor was it succeeded by that ill-conditioned state of the sore, accompanied with a thin fetid discharge, and hectic symptoms, which so frequently occur in this disorder. In the second case, as the patient's general health was tolerably good, the disease in the beginning approached to the nature of common inflammation, then gradually acquired the usual state of these abscesses, but afterwards became indolent; the sympathetic affection of the constitution exactly corresponded to the state of the abscess. At first the fever was inflammatory, then hectic;

tical; and when the local complaint became indolent, the general state of the patient's health was no longer affected. These circumstances still more strongly appeared after the accidental re-excitement of the inflammatory symptoms.

When I first began to open lumbar abscesses in the method I have recommended in this and my former Essay on the subject, I was extremely solicitous to do it in such a manner that the inner part of the aperture might act like a valve, to prevent any matter from oozing out, so as to keep the orifice open. I have found, however, that great care in this respect was quite unnecessary. I now make the opening with very little obliquity, and by using a broad abscess lancet, the wound is generally sufficient to give a discharge to those coagula which are so frequently found in the matter. I always completely empty the abscess, and then bring the lips of the orifice together

gether by means of lint and sticking-plaster, as after the operation of phlebotomy; and over these a compress and bandage are applied. I dress the wounds every second day, and of late have found little difficulty in healing them, though many of them granulate before they completely unite. The only troublesome circumstance that has lately occurred to me, has been an enlargement of the lymphatic glands on the front of the thigh, at the place where the abscess has been opened.

I should not have been so particular in describing what may, to some, appear unnecessary minutiae, had I not known instances where this mode of treatment was completely frustrated from want of attention to them.—With regard to the time of repeating the operation, it must be regulated entirely by the circumstances of the case; the matter collecting much faster in some persons than in others. It is best, I think, to wait until the integuments are sufficiently elevated to allow of a puncture being made in them without any hazard of wounding the parts under-

underneath.—Many patients bear even the first discharges without any loss of strength, notwithstanding the quantity of matter evacuated is very considerable; and almost all that I have seen, improve in health under the subsequent ones. The great disturbance that ensues, when, either by accident or design, a permanent opening is made in a lumbar abscess, should render surgeons extremely anxious to avoid such an occurrence altogether, if possible, or, at least, to delay it for a considerable time: and although the danger and the sufferings of the patient, when the abscess is opened, will be much greater where there is disease of the vertebræ; yet, as we had an opportunity of observing in the third case, this caution cannot be disregarded with safety, even when there is no reason to suspect any morbid condition of the spine.

The great benefit derived from occasional emetics and electricity, encourages me to hope that many of these abscesses may be dispersed without any permanent exposure of their cavity, and that thus the patient may
escape

escape the sufferings and hazard to which such an operation necessarily exposes him.

Where the vertebræ are sound, the disturbance excited by opening the abscess will in general subside gradually, and the wound will at last become indolent; in which state it may remain for a considerable time before it entirely heals, but without affecting the patient's constitution. Perfect quietude seems indispensably necessary in the irritable state of this disorder. I have thought issues very useful in some cases; but in others I could not perceive much advantage derived from them. A solution of opium injected, in one case, seemed beneficial, though it did not ascend above Poupart's ligament. From reflecting that the state of the constitution follows, and corresponds with, that of the abscess, I am strongly inclined to believe, that injections may be useful, in preventing the cyst, when it has become open, from acquiring that morbid condition which induces the hectic fever. In the records of former practice, we read of many extensive abscesses, into which irritat-

ing injections were daily thrown. According to the ideas which now prevail among surgeons, the additional irritation excited by these, would be supposed to create great mischief; yet, we are told that these patients recovered perfectly, and perhaps for the very reason I have suggested, viz. because the abscess was prevented from falling into the peculiar morbid state which induces hectic fever.

The injecting the cavity of a lumbar abscess cannot, I believe, be effected, unless a flexible pipe, such as a hollow bougie, could be introduced into it from beneath Poupart's ligament; when the injection might be thrown in, and applied to the whole surface of the cyst. In general, however, it would require a new opening to be made through the skin and fascia below Poupart's ligament, in order to effect the easy introduction of such a canula.

I have very little to observe respecting the medical treatment of these diseases. I ought, however, to mention, that I thought the administration

ministration of opium, at regular intervals, and in doses proportioned to the cause which required it, was very useful in mitigating the pain and irritability of the abscess, and in consequence the corresponding hectic fever. Although later experience has shewn me, that lumbar abscess and diseased vertebræ are more frequently connected with each other than at first I supposed, still I think it probable that they are much less so than was formerly believed. It is, perhaps, a curious circumstance, that, in the first eight cases of which I gave an account, there was no reason to suppose any disease of the spine existed. In the present twelve cases which I have related, the three patients who died, perished from the extraordinary degree of the disease in the bone. One woman, whose abscess was dispersed by electricity, has, in my opinion, a disease of the spine, and may, on that account, be liable to a return of the complaint. All the other cases, where the disease was unconnected with carious vertebræ, did well, although in some of them the abscess was

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large,

large, and the health much impaired by its formation,

At the conclusion of my former Essay on lumbar abscess, I suggested, that this mode of letting out fluids contained in sacs might prove useful in spina bifida. Only one instance of this disease has since occurred to me; and in it the circumstances were such, that little could be hoped for from any means.

CASE XIII.

A child, about four months old, was brought to the hospital for advice. From its screaming violently at times, and being also occasionally affected with strabismus, I thought there might be some disease within the head; but yet the child sucked heartily, and its bowels were in a natural state. But the complaint which principally required attention, was a spina bifida; the tumour was as large as an orange, and the dura mater which formed the
sac,

fac, had protruded through a vacancy in the upper part of the sacrum. The integuments covering the tumour were as thick and inelastic as the upper leather of a shoe, except at one part, where ulceration had lately taken place, and formed an opening through which the fluid contained in the dura mater had just begun to escape. The thickened state of the integuments probably arose from a variety of irritating applications being employed to disperse the tumour.—As I knew that the child must shortly perish if nothing were done, I punctured the swelling at some distance from the ulcerated part, and let out six ounces of perfectly limpid fluid. I then closed the aperture by means of sticking-plaster, dressing the sore with mild salve, and, afterwards laying a compress over the whole, made a slight degree of pressure on the part by applying moderately broad slips of sticking-plaster over the compress. Upon removing these dressings the second day after the operation, I found the puncture quite healed, the ulcerated orifice closed, and the sore having a

healthy appearance: the sac was now about half filled. In two days after, the ulcer was much better, and the sac nearly full. I now again discharged by puncture about the same quantity of limpid fluid, and afterwards applied the compress in the same manner. The thickened skin fell into wrinkles when the fluid was let out, but shewed no disposition to contract. The puncture was repeated every fourth day for six weeks, during which time the child's health continued unaffected; but the great obstacle to recovery still remained, viz. want of contractility in the skin, the dimensions of which did not seem to have varied from what they were at first. The plaster which covered one of the punctures being now by some accident rubbed off, the fluid continued to ooze out; nor could this orifice be afterwards brought to unite. The discharge gradually changed from a limpid to a puriform appearance; and in a few days the child died, but with much less pain, convulsion, or signs of inflammation, than in any case that I had seen.

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When the body was examined, I discovered more than one error in the formation of the spine and parts connected with it. There was not only a deficiency of bone, which allowed the dura mater to protrude and elevate the integuments in the manner already described, but the medulla spinalis, or a substance of an apparently similar nature, was continued into the sacrum, and there joined to that part of the dura mater which made the front of the bag. The nerves composing the cauda equina went off at their usual place. But there were other nervous filaments which arose from the unnatural prolongation of the medulla spinalis mentioned above, and which, like it, terminated in the dura mater forming the sac,

In some cases of spina bifida, the skin covering the tumour has not a natural texture; but in this case the diseased state of it was the effect of improper treatment. Under such circumstances, much benefit cannot be expected from this mode of treatment; but
where

where the integuments are sound, and naturally elastic, and where the malformation consists merely in a defect of a spinous process, I entertain hopes that a gradual contraction of the sac may ensue, if it be occasionally emptied, and moderately compressed. This unsuccessful case is related, as it shews, that, where the circumstances are more favourable, the attempt at a cure may at least be made without any hazard.

EXPERI-

EXPERIMENTS ON IRRITABILITY.

FONTANA observed, that a muscle which could no longer be excited to contract beneath water, was yet capable of acting again when removed from that situation, and exposed for some time in contact with air previous to its being stimulated. This observation suggested an idea, that air was in some way or other conducive to irritability. In the *Journal de Physique* are two Memoirs, by Dr. Girtanner, in which that gentleman endeavours to prove that irritability depends on the oxygenous gas taken into the blood during respiration, and is in a direct ratio to the quantity admitted; an opinion which some later writers in this country seem inclined to adopt. It is difficult, however, to conceive,

conceive, how oxygenous gas should in so essential a manner support the irritability of the body; and the opinion that it does so, is contradictory to all the ideas of that function, which we derive from general physiological research.—The question, if not absolutely to be determined, yet as it appeared to me capable of being illustrated by experiment, I endeavoured to examine in the following manner:

EXPERIMENT I.

If the newly-discovered method of exciting animal electricity be employed, a vivid contraction of the muscles will follow, as long perhaps as they retain their power of acting in this way. I accordingly had recourse to this mode of excitation, in order to ascertain how long muscular action would continue under certain circumstances.

Having killed a frog, I separated the pelvis and lower extremities from the trunk, deprived them of their skin, and divided them

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at the symphysis pubis. One leg was put into a bottle containing oxygenous gas procured from manganese, and which was very pure; the other into a bottle containing atmospheric air: the quantity in each bottle was about six ounce measures, and the limbs were supported in the airs, and wholly surrounded by them. After five hours, the muscles had nearly ceased to act in both limbs; those, however, of the thigh belonging to that limb inclosed in the common air, acting more vividly than the others; but in a little time, even these could be no longer excited.—Upon comparing the limbs afterwards, the muscles of that which had been exposed to the oxygenous gas were evidently the most flabby.—Several other trials were made with a similar result; whence I am disposed to conclude, that oxygenous gas has no greater power of supporting the irritability of parts *separated* from an animal, than the common atmosphere.

In some of the experiments, the muscles have continued to act after eighteen hours,
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but with little difference of strength in the two limbs. This variety in the duration of the excitability probably depends on the degree of vigour possessed by the individual animal from which the limbs were taken; for all those gasses which are injurious when respired, generally destroy the life of the detached parts of animals in nearly an equal space of time.

EXPERIMENT II.

Having prepared the limbs of another frog in the manner described in the former experiment, I introduced one of them into a bottle of azotic, and the other into a bottle containing an equal quantity of hydrogen gas, in order to see the comparative effects of these fluids upon animal irritability. The limb which was kept in azotic gas for two hours and a half, was incapable of being any longer excited; but that in the hydrogen gas acted faintly after being kept nearly four hours in that gas: the former also, on examination, appeared very flabby.—Several repetitions of this

this experiment afforded the same consequences.

EXPERIMENT III.

The prepared limbs of a frog were put into two equal quantities of carbonic and nitrous gas: both limbs ceased to act in an hour and a half.

EXPERIMENT IV.

One limb of a frog, prepared in the manner described, was inclosed in a vessel of carbonated hydrogen gas: at the end of an hour and a half, it would no longer contract. The other limb was immersed in water, from whence, after an hour and a quarter, it was taken out stiff and without action: but on softening the rigid muscles by the application of warmth with moisture, and afterwards exposing the limb to the air, I again excited perceptible contractions.

EXPERI-

EXPERIMENT V.

I put one prepared limb of a frog under the exhausted receiver of an air-pump; it lay on a plate of glass supported by a cup. Zinc was placed beneath the thigh, and gold under the leg; and by means of a probe passing through a collar of leather, I could touch both metals; so as to excite the muscles to contraction. This I did occasionally, and found the limb capable of excitement for twenty-two hours. The corresponding limb which was left exposed to the atmosphere; also contracted at the end of that time; so that it was doubtful which of them retained their powers in the greater degree.

The same experiment was repeated several times, with results so nearly alike, that I am induced to believe irritability continues very little longer in common air than it does in the exhausted receivers of an air-pump.

I have frequently produced numerous contractions in the limbs of frogs inclosed in
azotic;

azotic, hydrogenous, and other gasses; which likewise tend to shew that the cause of irritability does not depend upon oxygene for its power of action.

These experiments, I think, shew the impropriety of a term now commonly employed, by some perhaps metaphorically, but which many receive in a literal sense, I mean, the exhaustion of irritability during the contraction of the muscles: surely, if it was exhausted, it could not be so completely renewed as to continue to produce vivid contractions for a long time under such a variety of circumstances.

The event of these experiments, however, imparts no new information; it only tells us what we knew before,—that azotic, carbonic, and hydrogenous gasses are, in different degrees, injurious to life; and that oxygene gas, by itself, is not more beneficial than common air. The experiments shewing the long continuance of life and action in muscles placed under an exhausted receiver, are, however,

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worthy of notice; as they seem to prove, that the cause of irritability, when once it has been formed, does not require the assistance of external matter for the performance of its functions; and that it is less susceptible of change in this situation, than when exposed to the influence of the different gasses, which perhaps impair its vigour, or conduct it away from the animal fibre.

That the decomposition of oxygenous gas in the living body is the great source of animal heat, seems now to be fully proved; but how far it contributes to the production of irritability or of the living principle, we are not at present perhaps competent to determine. If the phenomena of irritability, like those of electricity or magnetism, should depend upon a subtile matter connected with another of a grosser nature, we have no more reason to suppose that it consists of oxygene, than of any other chemical substance. I am far from meaning to deny the great utility of oxygene in the functions of the animal body; but I think its importance has been
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over-rated.—I infer that it is not essential to vitality, because different tribes of animals partake of it in very different degrees, and those which have least of it are by no means the least vivacious. In warm-blooded animals, the air-cells of the lungs are very numerous and small, and the colouring matter of the blood exists in great quantity; so that a strong attraction of oxygene takes place from a surface of immense extent. In the amphibia, the surface is less from the great size of the air-cells; and there is less of the attracting matter. In fishes there is still less oxygene applied to the gills, and still less attraction for it in the blood*. The consequence is what we might

* That oxygenous gas combines with the blood, and imparts to it a scarlet colour, was, I think, sufficiently proved by the experiments of Doctor Priestley; but as this is a circumstance still doubted by many, I beg leave to relate an experiment which I made, in order to examine this subject still more fully.—I took the coagulum of venal blood left in a basin after bleeding, and turning it bottom upwards, waited till its surface had become of a scarlet colour: I then took slices of this surface, and similar slices of the interior part of the coagulum, which had a very dark appearance, and exposed them repeatedly to azotic and nitrous gasses. The scarlet colour gradually faded upon such ex-

might naturally expect,—a less production of heat in those animals which are the least capable of acquiring oxygene gas. There is, however, no corresponding decrease, but, on the contrary, an augmentation of vitality. —Again, if we reflect on the life of hydatids in closed sacs, of animalcules in the seminal vesicles, liver, gall-bladder, &c. and the length of time that many insects will continue to live, even when immersed in spirits, I think we must confess, that the presence of oxygene gas does not appear so essential to animal life, as many persons have of late supposed.

posure, and the azotic gas being afterwards examined, was found to contain oxygenous gas, while the nitrous gas was much diminished, doubtless by combining with the same principle. The gasses to which the dark-coloured blood was exposed, underwent no change in this experiment. That blood takes oxygenous gas from the air when it becomes florid, will not, I suppose, be denied; and the experiment I have related, shews that it will again part with it, though slowly, without any alteration in its temperature. When I exposed the serum of the blood to azotic gas, I did not find any oxygenous gas was given out by it; and this, as well as other reasons, have led me to entertain the opinion, that one great use of the colouring matter of the blood is, to readily combine and part with oxygenous gas.

SURGICAL

SURGICAL CASES

AND

REMARKS.

Of the Operation for the Aneurism.

ALTHOUGH the experiment of tying the artery above an aneurism has been repeatedly made, sufficient experience has not yet been acquired to enable us, with certainty, to prognosticate the event of such an operation. The two following cases are therefore offered to the public, with a view to contribute something to the present stock of knowledge on this subject.

CASE I.

George Dickens, aged thirty years, about eight months before his applying at the hospital, was rather suddenly, and without any

evident cause, affected with pain extending from the calf of his leg towards the ham, and so severe as to make him limp as he walked. When this had continued for some days, he took notice of a swelling in his ham, which throbbed violently, and continued gradually to increase in bulk till the time of his admission, March, 1795. The tumour was then of considerable size, but did not extend farther into the ham, than about two inches above the origin of the gastrocnemius muscle. The pulsation was then obscure; but on remitting the pressure with the fingers after having continued it for some time, an influx of fluid into the tumour was so distinctly perceived, as to render the nature of the case not at all doubtful. The leg was œdematous, and an erysipelatous blush surrounded the knee.—An attempt was made to compress the femoral artery just before it passed through the tendon of the triceps muscle, in order to see if it would lessen the size, or diminish the pulsation of the aneurism; but it gave the patient great pain, and considerably increased the swelling of his leg. After he had been a
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fortnight in the hospital, the size of the aneurismal tumour, and the general swelling of the limb, were so much increased, that it was thought dangerous to defer the operation any longer. Mr. Blicke being indisposed at the time, it became my duty to perform the operation, which I accordingly did in the following manner: Having made an incision about two inches and a half in length, through the integuments and fascia of the thigh, near to the outer edge of the sartorius muscle, I separated the parts with my fingers, until I had laid bare the tendinous expansion which connects the lower part of the triceps muscle to the vastus internus, under which the vessels immediately lie. This being cut through, I immediately discovered the vessels, and passing my finger beneath them, could distinctly feel the artery pulsate between my finger and thumb. Having thus separated the vessels from their surrounding connections for about an inch in length, I thought it of great consequence to preserve their attachments at the places

where they were to be tied. I therefore passed two common-sized ligatures beneath them, and having shifted one upwards, and the other downwards, as far as the vessels had been detached from their surrounding connections, I tied both firmly. The ligatures were about an inch asunder, so that all that portion of the artery which had been detached, remained entire between them. It is right to mention, that no nerve was tied; but the veins accompanying the artery were included in the ligature. The divided parts were now brought together by means of sticking-plaster, except at the places where the ends of the ligatures were left hanging out of the external wound, which were respectively opposite to the part of the artery inclosed by them. The patient complained of much pain after the operation, occasioned by the pulsation of the artery at the part where it was tied; and likewise of an uneasy sensation of tightness extending from the wound down to the inside of the knee: nor did these feelings entirely abate

abate for many days afterwards*.—The diseased limb was rather colder than the other during the two first days; but at the end of that time it had acquired, and afterwards continued to possess, its natural warmth. In a few days the aneurifmal tumour, and the swelling of the limb, were greatly reduced; the integuments united by the first intention both above, below, and between the ligatures; and from the openings where the ends of the threads hung out, there was a discharge of healthy pus, which rather increased in quantity for the first ten days, and then gradually diminished. The upper ligature came away on the thirteenth, and the lower on the fifteenth day after the operation, and the openings left by them closed soon after.

I think it deserves notice, that the portion of artery included between the ligatures, did not perish, notwithstanding it was necessarily

* These symptoms determined me to divide the artery, in any future case, between the two ligatures; by which means it will be left quite lax, and the uneasiness in question will, I think, be prevented.

deprived

deprived of all nourishment conveyed in the direction of the vessels, and also had been completely detached by my finger during the operation from all its lateral connections.

The aneurismal tumour, which had lessened very quickly and considerably at first, became afterwards much softer, its contents seeming to be converted into a fluid; and from that time it decreased very slowly. The patient therefore remained in the hospital two months after the wound was entirely healed; nor could he perfectly extend his leg at the time of his dismissal.—I saw him about ten months afterwards, walking with very little appearance of infirmity: both legs were of the same size, and he told me there was very little remains of the swelling.

CASE II.

Feb. 1796.—James Lindsey, aged thirty-four, about a year ago perceived a swelling beneath the calf of his right leg; and soon
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afterwards, whilst walking, he suddenly felt, he said, "as if he had been struck on the part "by a cannon ball," the pain being so great that he could not move for several minutes. The pain, however, gradually abated; but the swelling of the leg had continued to increase since that time. The whole calf was now lifted up by a quantity of blood effused beneath it. The muscles appeared thin, and were so extremely tense as to occasion great pain, accompanied with considerable erysipelas of the whole leg; so that a speedy ulceration and sloughing, or sudden rupture of the distended part, was hourly to be dreaded. Under these circumstances, tying the artery above the aneurism, was the only means of relieving the patient from his present suffering, and of preserving him from sudden death. But what was particularly discouraging, both to the patient and surgeon, was the discovery of another aneurism, situated in the femoral artery of the opposite limb. No preternatural pulsation, however, could be felt in any other part of his body.—The operation
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was performed by Mr. Blicke, in the same manner as described in the foregoing case, with this addition, however, that when the two ligatures were tied, the artery was divided between them. The lips of the wound were then brought together by slips of sticking-plaster. This patient's limb was for some time much colder than the other, and nearly three days elapsed before it had regained its natural degree of warmth; but the tension, pain, and erysipelatous inflammation quickly subsided. The divided integuments united above and below the ligatures, but not between them as they had done in the former instance; and there was also a larger discharge from the wound: both of which were probably owing to the state of the patient's constitution, which was much reduced in point of strength. This man, however, did not complain of the least throbbing, tension, or pain in the wounded part; and this entire exemption from the sufferings of the other patient, I could not but attribute to the division of the artery. The upper ligature came away
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on the tenth, and the lower on the fifteenth day ; after which the wound healed gradually, though very slowly.

About five weeks after this operation, the aneurism in the opposite thigh was almost ready to burst ; the tumour having acquired a pyramidal form, and the skin covering the apex having yielded so much as to form a kind of process from the tumour. Indeed the integuments at this part were so thin, that we every hour expected them to give way. The aneurism was situated so high, as to make it probable that the disease extended above the place where the arteria profunda is sent off. The patient had hitherto refused to submit to the operation ; but on reflecting that if the tumour should burst in the night, he must perish unless the bleeding vessel could be immediately secured, he consented to let me tie the artery in the groin whilst we had daylight, and proper assistance. The tumour approached so near to the groin, as to prevent us from compressing the artery against the bone ; for, in attempting this, the compress occupied

occupied the place where the incision ought to be made, and our endeavours to make a compression still higher, were ineffectual; they weakened, but did not interrupt the pulsation of the tumour. As the artery was so imperfectly compressed, hæmorrhage took place during the operation, which, though not dangerous to the patient, proved extremely embarrassing to the surgeon; for in attempting to lay bare the fascia of the thigh, I divided, by the very first incision, so many small arteries supplying the inguinal glands, and also so many veins, that the blood which was poured forth, completely filled the space made by the incision, and overflowed the side of the wound. The application of the sponge, the usual resource on those occasions, was of no avail; for the wound was instantly filled again, so that the whole operation was to be done upon parts covered with blood, where the only guide in its performance was the feeling. I did indeed see some exposed inguinal glands, and found that I had divided two of them in trying to get at the fascia of the thigh. As soon as I could distinctly

distinctly feel this part, I made a small opening through it, and introducing my finger, I divided it upwards as far as Poupart's ligament, and downwards as low as the aneurismal sac would allow me. The pulsation of the artery now served as my guide. Laying aside, therefore, all surgical instruments, I made way with my finger in a perpendicular direction, till I could touch its coats, and then, with my finger and thumb, separated it from its connections, so as to be able to grasp it alone between them. I then passed two ligatures under it by means of an eyed probe, and drawing one of them upwards, and the other downwards, as far as the space would permit, I tied them firmly. The upper ligature was about half an inch from the os pubis, and the lower one the same distance from the arteria profunda, which vessel I had distinctly felt before I tied the ligatures.

There are, perhaps, few situations of aneurism where the artery can be tied so separately and distinctly as here; the pulsation directs the surgeon to the precise situation of
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the vessel; and if he only keeps sufficiently close to its sides when he passes the ligature round, neither the vein nor the nerve can be included. I did not divide the artery between the two ligatures; it was suggested that I had better not; and I knew that I could obtain all the advantages of a relaxed state of the vessel, by merely bending the thigh upon the pelvis. The patient did not, after the operation, suffer any kind of pain from the wounded parts; which, I think, shews, that the artery did not inflame much in consequence of the ligature. The suppuration was moderate, and every thing relative to the wound went on as well as could be expected. The limb, and particularly the foot, was colder than that of the opposite side; but in about three days, it gradually acquired its natural temperature; and it all along retained a perfect state of sensibility, which I considered as a proof that it was sufficiently nourished. To prevent the heat from being carried off faster than it was generated, the limb was wrapped in flannel; but I avoided the application of any artificial warmth, lest its stimulus should prove injurious,

rious, by exciting action when the powers of life in the part might have been considerably diminished.

The blood in the aneurismal sac did not appear to have coagulated before the operation; for the bulk of the tumour could be greatly lessened by pressure, whenever the patient would allow the attempt to be made; so that I conclude the limb had received nearly its usual quantity of blood through the femoral artery, until that vessel was tied. The tumour diminished greatly after the operation, and the blood contained in it became coagulated. This reduction of the swelling, I think, was owing to a considerable part of the blood passing onwards through the femoral artery: and I regretted afterwards, that, at the time of the operation, I had not endeavoured to press all the blood from the aneurismal sac; which experiment would have shewn how far it was fluid or coagulated.

Every thing, with respect both to the state of the limb, and the patient's general health, went

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on well till the fifteenth day, when the upper ligature unexpectedly separated, and the blood gushed in a full stream from the open extremity of the vessel. This fortunately happened during the attendance of the surgeons at the hospital, and the bleeding was stopped by pressure until their arrival. The stream of blood which flowed upon any remission or wrong application of the pressure, was so large, that we did not dare to remove the patient even from the bed on which he lay. Mr. Ramsden undertook, in this situation, to prevent the further escape of blood from the vessel, whilst I proceeded to tie the artery above Poupart's ligament. Accordingly, I first made an incision, about three inches in length, through the integuments of the abdomen, in the direction of the artery, and thus laid bare the aponeurosis of the external oblique muscle, which I next divided from its connection with Poupart's ligament, in the direction of the external wound, for the extent of about two inches. The margins of the internal oblique and transversalis muscles being thus exposed, I introduced my fingers beneath

beneath them for the protection of the peritonæum, and then divided them. Next, with my hand, I pushed the peritonæum and its contents upwards and inwards, and took hold of the external iliac artery with my finger and thumb, so that I was thus enabled to command the flow of blood from the wound. It now only remained that I should pass a ligature round the artery, and tie it; but this required caution, on account of the contiguity of the vein to the artery. I could not see the vessels; but I made a separation between them with my fingers. Having, however, only a common needle with which to pass the ligature, I several times withdrew the point, from the apprehension of wounding the vein*. After having

* It would be, I think, an useful addition to our surgical instruments for such purposes, to have needles made with handles of pure, and consequently flexible, silver, and with steel points that have edges just sharp enough to pass through the cellular substance; but neither so pointed nor so sharp, as to endanger the wounding any parts of consequence that may be contiguous to those round which they are passed. When the points of these instruments were once passed underneath the vessel, the surgeon could bend their

having tied the artery about an inch and a half above Poupart's ligament, I divided that part, and thus laid the new and the former wound into one. I traced, as well as I could with my finger, the continuation of the artery, from the place where the ligature was now made, to that where it was formerly applied. I wished to have divided the artery, and to have suffered it to retract behind the peritonæum; but I found it so attached to the surrounding parts, as to render such division difficult, and perhaps not advisable.

The lips of the wound were brought together with sticking-plaster, and one suture only was made, opposite to the natural situation of Poupart's ligament. The peritonæum was pressed back into its place, and the protrusion of it restrained by bringing together the integuments with strips of sticking-plaster.

handles so as to accommodate them to the space they have to turn in, and thus avoid an inconvenience which, I believe, most surgeons must have experienced; I mean, the great difficulty of turning a common needle in a deep and narrow wound.

No perceptible alteration occurred in the state of the limb after this second operation; but the patient's health was considerably reduced, by his having suffered from the complaint nearly twelve months, by having undergone three operations, and by the loss of a considerable quantity of blood. No adhesion took place between the divided parts; the edges of the wound were open and sloughy; the wound was painful, discharged a great deal of pus, and was so extremely tender, that he could not bear it to be touched. Still no great mischief appeared till the fifth day after the operation, when a hæmorrhage of arterial blood took place in such quantity, that there was no doubt but that it arose from the principal artery, though the ligature with which it was tied still remained firm. The patient's health was now so impaired, and his weakness so great, that an attempt at tying the artery still higher up, would have appeared like torturing him without any hopes of ultimate success. The wound was therefore cleansed and dressed; some compresses were applied upon it, and bound down by the spica bandage. By this

treatment the hæmorrhage was stopped ; and the attendants were ordered to make a pressure on the bandage if any fresh bleeding should occur. The compresses were renewed for three succeeding days ; and though occasionally the wound bled, yet it was not profusely, or in such quantity as to destroy the patient : his strength, however, gradually declined ; a troublesome cough occasioned extreme pain in the wound, and in the course of the third day he died.

Dissection.

No marks of disease were discoverable in the aorta, or in the internal iliac artery. The external iliac was covered by a great number of lymphatic glands, which prevented it from being readily distinguished ; yet, when separated from these, it did not appear diseased. For nearly two inches above the part which was tied, the lymphatic glands covering the artery were considerably enlarged, in consequence of the irritation excited by the ligature. The external surface of one of them

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next the wound, had ulcerated; and the ulceration penetrated through the gland, and communicated with the artery, as was afterwards proved by slitting open that vessel. It was through this aperture that the blood had escaped; for the ligature still remained firm upon that part of the artery which it had inclosed. From this ligature to the place where the vessel had formerly been tied, the artery was so closely connected with the surrounding substance, that dissection was required to separate them. The parts of the artery from which the former ligatures had separated, were about half an inch asunder, and the canal of the vessel appeared perfectly open.—The whole of the vessels from the bifurcation of the aorta, to the aperture in the tendon of the triceps muscle, were now removed, and carefully dissected; and after being stuffed, and hardened by spirits, they were cut open to shew the state of them internally. A coagulum of blood, about two inches long, was found above the part where the last ligature was made. At what time this coagulum had been formed, is perhaps difficult to

ascertain; it did not seem to have taken place after death, for above it the artery contained no blood; and if it had occurred before death, it is probable that it would have prevented the hæmorrhage. I have already remarked, that the man did not bleed for some time previous to his death; in which interval, perhaps, this coagulum had been formed.— The ulcerated opening from the artery through the diseased gland, admitted the passage of a moderate-sized bougie. The ligature, which still firmly inclosed the artery, had brought its sides in contact, so as to render it probable that they would have united. All the other parts of the femoral artery were quite open, so that a large bougie could be passed from the lower end of it, through the aneurismal sac, to the place where the ligature now remained. About half an inch of the artery was wanting, which had been, as it were, cut out by the ligatures in the first operation. The sides of the arteries below the part which was tied were thicker than natural, and their internal surface was rough, and of a yellowish white colour. The arteria profunda was filled with
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coagulated blood, and had become reduced to less than the natural size. The sides of the artery of the opposite limb had firmly united at the part where it had been tied. No coagululum was found in it, and it had not diminished in size in any remarkable degree above the part which was closed.

The laying bare a portion of an artery, and tying it, in order to stop the current of the blood, was in some degree a new operation in surgery. It is not wonderful, therefore, that errors were at first committed in the performance of it. The failure in this operation appears to have been of two kinds; first, that which arose from the inflammation and ulceration of the artery; and, secondly, that which proceeded from want of union between the sides of the vessel. When an artery was laid bare, and detached from its surrounding connections, the middle of the detached portion was tied with a single ligature. An artery thus circumstanced must necessarily inflame; which

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it would do in different modes and degrees, according as the state of the constitution, or of the part, was more or less healthy. It seems very probable that under these circumstances the inflammation of that portion of the artery which had been detached from its natural connections, would proceed either to suppuration or ulceration, and in either case an outlet would be given to the contained blood. The occurrence of hæmorrhage led some surgeons to adopt a practice which I cannot but consider as injurious. They applied a second ligature above the other, leaving it loose, but ready to be drawn tight if the first should not answer. The second ligature, however, must not only keep a certain portion of the artery detached from the surrounding parts, but must also give additional irritation to the inflamed vessel; and on both these accounts it is more likely to make the inflammation end in suppuration or ulceration. For similar reasons, I think, pieces of wood, cork, or other substances, must be detrimental, as they require a greater detachment of the artery for their application, and afterwards irritate by their presence.

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They have been employed by surgeons with two views; first, to prevent the ligature from cutting the artery. In this respect, I believe their interposition is not necessary, as such an accident scarcely ever occurs when the artery is tied in the usual manner. Secondly, to compress a certain extent of artery, so as to cause adhesion of its sides: but experience has proved that they will rather produce ulceration of the vessel than this effect. Indeed the attempt to employ pressure in this way requires so much dexterity in its application, and so much precision in regulating its degree, as to render it, in my opinion, inadmissible in common surgical practice. Mr. Hunter soon perceived the reason of the hæmorrhage after the operation, in the first cases that occurred to him; he saw that the ulceration arose from an irritated and unsupported state of the artery, and sought to remedy the defect by closing the parts about it. The mode, therefore, which Mr. Hunter's experience and judgment taught him to adopt, was, to expose as small a portion of the artery as possible, and, after having tied it, to bring

bring the surrounding parts into contact with it again. It is scarcely possible, however, to pass a ligature with certainty round a deep-seated artery without first introducing your finger beneath the vessel; to do which, in general, nearly an inch of the artery must be detached. When the ligature is applied in the middle of such a detached portion, so as to cause the death of that part inclosed by it, there will still be a certain extent, both above and below the ligature, liable to ulcerate, particularly in unsound arteries. It seems to me, therefore, that it might be better to use two ligatures, as was done in the foregoing cases, applying one of them as high up, and the other as low down, as the operator can, so as to inclose the artery at those parts where it is surrounded by, and remains attached to, its natural connections. Another advantage which, in my opinion, results from this plan, is, that it allows the division of the artery between the two ligatures. Some degree of inflammation must necessarily be excited in the tied vessels; and every surgeon knows how much the inflammation of parts is aggravated when

when they are kept in a tense state. But when the artery, tied in this way, is divided in the space between the ligatures, it becomes quite lax, possesses its natural attachment to the surrounding parts, and is, in short, as nearly as possible, in the same circumstances as when tied upon the surface of a stump after an amputation. If such a ligature does not soon come away; if it remains for more than a fortnight upon the ends of the vessel, it becomes difficult to imagine a cause why the sides of the vessel are not united.—In the two cases which I have related, the sufferings of the patients were very different. In the first, although the man's health was comparatively good, and the healing process went on as well as could be wished, so that the lips of the wound united between the two ligatures; yet this person suffered much from pain in the part, accompanied with a considerable throbbing of the artery for some days; whilst, in the other, the patient scarcely experienced any uneasiness, although the wound did not heal nearly so well.

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The ulceration of the artery has certainly been the cause of the greater number of failures; this, however, is an effect which, I hope, experience has now taught us to prevent*. But I acknowledge myself totally at a loss to devise any plan for obviating the other cause of failure in these cases, namely, the want of union between the sides of the artery. The second case affords an illustration of both these causes, particularly of the latter. Here the ligature which was first applied, did not separate till the fifteenth day; yet the mouth of the vessel remained as open as if it had been newly cut across; nor was there any tendency of the vessel to close below the ligature, except in the *arteria profunda*. Though we may be unable to counteract this indisposition in the sides of the artery to unite, it seems, however, of consequence, that we should protract, as long as possible, the separation of the ligature,

* The ulceration which took place in the last operation, cannot, I think, be considered as contradicting this assertion; for such was the state of the patient's health, that if a wound had been made in any part of his body, I believe, instead of closing, it would have become painful and enlarged.

to give time for this desirable event. Ligatures are, I believe, slow in their separation, in proportion as they include more of the surrounding substance, or as they are drawn less tight. We cannot, however, expect a ligature to remain upon a vessel longer than a fortnight; nor is it likely, if the artery be not closed in that time, that such an event will afterwards happen. Why the femoral artery did not unite in the case last related, I am quite at a loss to determine. Dissection, I think, proved that it had not suffered excess of inflammation in consequence of the first ligature; neither was there a deficiency of that process; for the cellular substance in which the vessel lay, had become thickened and adherent to it. Although I have several times seen the operation for the aneurism performed after Mr. Hunter's method, yet this was the only instance in which it did not succeed; which leads me to conclude that the least remediable cause of failure in this operation is not a frequent occurrence. As I cannot ascribe the want of success here to any other cause than a diseased state of the vessel, it seems

seems right to apply the ligature as far as possible above the aneurism; and as this appears to be an object of importance, I feel great pleasure in having been able to relate a case, which shews how very high such an operation may be performed with safety to the limb, though repeated instances are required to give us assurance on this subject.

The obstruction which an aneurism occasions to the supply of a limb by the vessel in which it takes place, is probably not considerable until the blood coagulates on the inside of the sac. As far as I am capable of judging, the blood, in the aneurism last described, was very little, if at all, coagulated; but, as I have often regretted since, I did not try to ascertain this circumstance at the time of the operation. The previous state of the artery below the aneurism, which was observed in the dissection, is also an additional reason for supposing that the blood had not been much diverted from its natural channels previous to the performance of the operation.

Of Emphysema.

Much praise is, in my opinion, due to Mr. John Bell, for the clear and spirited description which he has given of the state of the lungs in emphysema. The following case is related, to corroborate his remarks, and also to explain and lead to others which I am desirous of offering to the public on that subject.

C A S E.

A poor woman, about forty years of age, was run over by a mail-coach; one of the wheels of which passed lengthwise over her back, and fractured several of her ribs on the right side. When brought to the hospital, she breathed with much difficulty, and an emphysema of the integuments had taken place. An opening was made through the skin to let out the air; and the emphysema did not afterwards spread. The patient was bled largely; but the difficulty of breathing

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had increased to the third day, at which time I first saw her, in company with Mr. Harvey, under whose care she was. She had passed the preceding night without the least sleep, and breathed at this time with extreme difficulty; indeed it seemed as if she could not long continue the labour of such imperfect and distressful respiration. It was supposed that one side of the thorax was filled with air, and as it was suspected that the opposite lung might be oppressed by this cause, it was agreed to extract the air from the right side of the chest. With this view, Mr. Harvey made an opening into the thorax, in the following manner: He first made an incision about two inches in length, through the integuments, near the middle of the seventh rib, and opposite to its lower edge. He then drew the skin upwards, so as to expose the intercostal muscles which connect the upper edge of this rib to the one above it. These he cautiously divided, as he next did the pleura. At the time this was effected, I believe the patient was in the act of expiration; for a blast
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of air evidently issued from the thorax ; and afterwards, whilst the integuments were kept retracted, and the aperture in the pleura consequently uncovered, the external air continued to rush in during the enlargement of the thorax, and to be forced out again during its contraction. But when the divided skin was allowed to descend to its natural situation, and thus the opening in the pleura was covered, no farther passage of air took place ; and all that could then be perceived, was a depression of the integuments opposite to the aperture in the thorax, occasioned by the pressure of the atmosphere during the enlargement of that cavity. I had got ready a large injecting syringe, and introducing the pipe into the cavity of the chest, I drew up the piston, and thus exhausted the air, till I found I was stopped from proceeding, by the lung, which had risen up and applied itself to the mouth of the syringe. The skin was then immediately brought down over the aperture in the thorax, and served, like a valve, to prevent the farther ingress of air into that cavity. About ten ounces measure of air might probably

have been thus extracted by the syringe. As this quantity of air could have occupied but a small space when compared with the size of the thorax, it was probable that the back part of that cavity was filled with fluids.—Nothing further, however, was done at this time; and shortly after the poor woman fell asleep, and breathed with comparative ease for nearly six hours. But the difficulty of breathing again increased during the night, and, at noon on the following day, was nearly as great as ever. Mr. Harvey and I agreed, however, that it would not be wrong to inspect the thorax, to see if the lung had collapsed, or if we could by any means afford relief to the patient. Upon separating the adhesion which had formed between the skin and subjacent parts, and introducing a finger through the aperture in the pleura, we found the lung adhering to the inside of that membrane; but upon slightly varying the patient's posture, some turbid bloody serum flowed from beneath the lung. When we had discharged as much of this fluid as we conveniently could, the external wound was closed; but the patient

continued

continued to breathe with increasing difficulty till about midnight, when she died.

Dissection.

On examining the body, no air was discovered in the cavity of the chest. The right lung was partially inflated, and the anterior part of it closely adhering to the pleura costalis, as far as the place where the opening had been made. About three pints of bloody fluid lay in the hollow of the ribs posteriorly, and about half filled the cavity of the chest on that side; the surface of it being nearly on a level with the opening which had been made to exhaust the air. Upon the surface of this fluid, the half-inflated lung seemed to float. —I looked for the place where the lung had been wounded by the injury; but cannot say that I could perceive it. It was, however, certainly healed; for the lung bore inflation without letting the air escape from it. The pleura was covered with coagulated lymph. The cells of the lung contained a quantity of fluid, and the whole substance of it was of a

livid colour.—The cells of the lung of the opposite side of the chest also contained more than their ordinary quantity of fluid; its vessels were turgid, and it was hard and thickened in several places; which was probably owing to former disease. There was likewise more than a usual quantity of turgid serum in the left cavity of the thorax.

It seems to me highly probable, that there are two states of the lungs in emphysema; one of which, indeed, I have never proved by examination, and am led to believe the existence of it merely from reasoning. I have seen so many cases of emphysema attended with very little difficulty of breathing or other inconvenience, indeed, proceeding in a manner so like cases of fractured ribs unaccompanied with wounds of the lungs, that I cannot suppose patients were in these cases reduced to the necessity of breathing with one lung only. These patients indeed were all treated in the manner recommended and practised by Mr. Blizard.

Blizard. That excellent surgeon, observing the great pain and irritation which the constant motion of the fractured ribs occasioned, was induced to disregard the emphysema, and to confine the motion of the ribs by a tight bandage, in the same manner as when the lungs are uninjured: afterwards the patients were largely bled, and other evacuations freely pursued. This practice he has since continued with general success. I also have seen this treatment attended with such frequent and complete success, as induces me to believe, that under such circumstances the wounded lung continues in very many cases to fill the cavity of the chest. The pressure of the bandage in general prevents the air from escaping out of the wounded lung, and pervading the cellular substance. It will, perhaps, appear probable to many surgeons, that, for this very reason, the air will be likely to insinuate itself between the two pleuræ, and thus occasion a collapse of the lung. I do not, however, see any good reason for such a supposition. The two pleuræ remain in their natural state of contact; and there is no space for the

air to pass between them. So frequently also are there adhesions between the surface of the lung and the sides of the thorax, that I think, in some of the cases of emphysema which I have seen, this circumstance must have occurred, and that if the lungs had receded from the sides of the thorax, the symptoms would have indicated the laceration or stretching of these adhesions.

An idea has generally prevailed among surgeons, that if the pleura costalis were divided in the living subject, the lung would immediately collapse, as it is usually found to do in the dead one. But M. Bremond* has shewn by experiments, that not only when an opening is made into the cavity of the thorax, but even when some of the ribs are removed, the lungs still occupy their natural situation, and are even thrust up into the opening during expiration. Mr. Norris has also lately shewn, by experiments undertaken for this purpose, as well as by observations on the effects of accidents, that frequently the lungs do not collapse when the cavity of the chest is ex-

* Memoires de l'Acad. des Sciences, 1739.

posed in the living animal*; and I have also had occasion to observe, on dividing the pleura costalis in a case of supposed hydrothorax (in which, however, no water was found), that the exposed lung did not collapse; a circumstance which, I think, ought to encourage us to a more frequent performance of such an operation. In other experiments, however, the lungs have been known to collapse; and the circumstances on which either of these effects depends, are not perhaps well understood.

For these reasons, I believe, that in most cases of emphysema succeeding to broken ribs, pressure by bandage not only hinders the air from diffusing itself through the cellular substance, but serves to prevent it from escaping out of the wounded lung, and of course facilitates the healing of the wound, which would be prevented by the constant transmission of air. Its early application, therefore, will often prevent a very troublesome symptom, whilst at the same time, by keeping the fractured bones from motion, it greatly lessens the sufferings of the patient.

* Memoirs of the Medical Society of London, Vol. IV, p. 440.

In some cases where the lungs are wounded by the ribs, the air does undoubtedly get into the cavity of the thorax, as happened in the poor woman already mentioned, and as I have also seen in other instances. When the air passes from the wounded lung into the cavity of the chest, and the lung becomes in consequence collapsed, still the symptoms and progress of the complaint will differ from the effect of circumstances which have not been much attended to. When the wound in the sides of the thorax allows of the expulsion of air from that cavity during expiration, and does not admit air during inspiration, it is not to be supposed that the wound of the lung can heal; for the cavity of the thorax must, under these circumstances, be filled from the wounded lung every time that it is enlarged during inspiration.

But this state of circumstances, which is so particularly injurious, and which usually takes place when the lung has collapsed in the manner described, it is the business of the surgeon to remedy; and it may be accomplished in two ways :

ways: First, by preventing the escape of the air from the cavity of the chest, in which case the necessity of its being filled from the wounded lung will, in a great measure, be done away. And as I know surgeons have apprehended, that if an outlet was not given to air from the cavity of the chest, the opposite lung might become oppressed, I beg them to reflect a little on the state of respiration under these circumstances.

To examine this subject, let us suppose the thorax expanded, and one of its cavities filled with air, at which time the patient attempts to make an expiration; what will be the effect? The air cannot return through the wound in the lungs; and we have supposed that it cannot escape through that in the pleura costalis. The muscles of respiration are unable then to produce any considerable change in the dimensions of the cavity, without an exertion productive of pain, which it is not probable that they will make; the inactive diaphragm will not be thrust up into the hypochondrium as in natural expiration, and the ribs will remain nearly stationary;

ary; but in proportion to the degree of the expiratory effort that is made, the air may be condensed, and the mediastinum thrust to the opposite side of the chest. But no injury will arise from this pressure, neither can it happen in any great degree; for both sides of the chest being diminished at the same time, a slight compression of the opposite lung cannot be detrimental, since it helps to express the air from it,—the very effect which is now required; and as that lung is pressed inwards by the sides of the thorax, it will counteract any great pressure made on the mediastinum. Upon inspiration taking place, the condensed air will expand and fill the enlarged cavity, and the mediastinum will regain its natural situation; so that the function of the sound lung is scarcely, if at all, impeded by the compression which takes place on the opposite side of the chest,

In whatever state the lungs happen to be when they are wounded, a bandage, if it can be borne, seems therefore to me extremely useful. By means of it, the pain and irritation which the
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motion of the fractured ribs must otherwise occasion, are in a great measure, or entirely, prevented. In that state of the lungs which I have first described, the pressure of a bandage prevents emphysema, and does no harm; in the other, it not only prevents emphysema, but does good, by keeping the collapsed lung at rest, and thereby free from the necessity of constantly transmitting air. Patients, however, will not always be able to wear a bandage when one lung is collapsed (particularly if any previous disease has existed in the other), as it equally confines the motion of the ribs on both sides, and as every possible enlargement of the chest becomes necessary for the due admission of air into the lung which still executes its functions. Under these circumstances, if the emphysema continues (and its continuance must always denote that the wound in the lung is not closed), I should esteem it the best practice to make a small opening into the chest, so that the external air might have free communication with that cavity; and then the injured lung must remain motionless till its wound is healed, and the

the mediastinum will, in every state of the thorax, preserve its natural situation.

As almost all the circulating blood must, in such cases, be transmitted through the vessels of one lung, if the quantity of that fluid be not greatly diminished, the pulmonary vessels will become turgid; a larger effusion of fluids will therefore take place into the air-cells, and cavity of the chest; and thus the function of the acting lung will be materially impaired. This reasoning illustrates what experience has already determined, viz. that the preservation of life in these cases depends on the most copious blood-letting.

The case which I have related, clearly shews, that the collapsed state of the lung affords an opportunity for the wound of its surface to heal: and when this desirable event is accomplished, the air which is at that time in the cavity of the thorax, will be speedily absorbed, and the lung will again acquire its former size and situation. But should the function of it be more immediately necessary,
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from a diseased state of that on the opposite side, or from other circumstances, it may be more quickly restored by exhausting the air, in the manner described.—If the cavity of the chest contain a quantity of fluids, and it is thought right to extract them, it cannot well be done by varying the posture of the patient so as to let them run out of the opening that has been made: the difficulty with which respiration is performed, will render such an attempt almost insupportable to the patient. It would therefore be better to introduce a hollow bougie, or some such instrument, into the posterior part of the thorax, there connect it to the syringe, and thus extract the contained fluids. I need scarcely add, that the same method may be employed with advantage for the extraction of water from the cavity of the chest in hydrothorax.

The great advantage of retaining the lung in a collapsed state is, if possible, more strikingly shewn when those bodies have suffered a greater degree of injury than can occur to them from the fracture of a rib. I have seen
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cases in which bullets have passed through the lungs near the root of those bodies, and where many of the large vessels were consequently torn, in which the blood has been poured into the cavity of the chest, has condensed the lung by its pressure, and thus suppressed the hæmorrhage. The injured vessels might, under these circumstances, unite; and the blood being let out of the thorax, the lung might gradually be restored to its former function. Yet in the cases which I was a witness to, the patients died of inflammation and fever; but the particular nature of the circumstances was unknown during the life of the patient; and of course the conduct appropriated to them was not pursued. The fluids contained in the cavity of the thorax had in these cases undergone a degree of putrefaction previous to the patient's death; which state required their discharge.

But should this be attempted in other cases, it becomes very essential to keep the thorax filled with air, lest the lungs should become prematurely inflated, the newly-healed part
lacerated,

lacerated, the hæmorrhage renewed, or inflammation induced; and the surgeon would be able, I believe, without much contrivance, to regulate the inflation of the lungs, as circumstances seemed to indicate. Surgeons used formerly to keep canulæ in the thorax in these cases, with a design to give an outlet to fluids; but such means might have been beneficial by preserving the lungs collapsed; and they might have been continued from being found serviceable, though the manner in which they became so was unknown.

Of the Use of Mercurial Fumigations.

In addition to these cases which occurred at the hospital, I think it may be useful to give an account of some others, in which mercurial fumigations were employed for the cure of the venereal disease, after the manner recommended by the Chevalier Lalouette: for I have witnessed so much comfort as well as benefit arising from them, that I think, if their peculiar advantages were generally known to practitioners, they would be much more frequently employed. As I believe the relation of cases will afford, in the shortest manner, the clearest view of the peculiar utility of this mode of employing mercury, I shall therefore present the reader with an account of a case of each class, in order to shew the advantages which attend this method of using that medicine: First, from its affecting the constitution when other means have failed; and, secondly, from its producing
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its effects in a much shorter time than any other mode requires.

I beg leave, however, previously to observe, that the term, mercurial fumigations, is apt to excite wrong ideas of this method in the minds of surgeons. Fumigations have been, of late, generally employed to correct local diseases; and they have often, by design, been made of an acrid quality. And even when they were formerly employed with a view of affecting the constitution, it was at a time when the chemical compounds of quicksilver were not understood, and sufficient attention was not paid to those circumstances on which the success of their application depends.

But, in the year 1776, the Chevalier Lalouette, a physician at Paris, laid before the public an account of a new mode of mercurial fumigation, free from the inconveniencies of former ones, and which, in the space of thirty-five years, he had successfully employed in more than four hundred cases, that had re-

fisted all the ordinary methods of cure. His method consisted in enclosing the patient, previously undressed, in a kind of box resembling a sedan chair, with an opening at the top to let out the head, and another at the bottom, to which was fitted a small grate or furnace, having in it a heated iron for converting the mercurial remedy into fume. The preparation he made use of was a kind of calomel, which, by repeated sublimation from iron-filings, was so far deprived of its muriatic acid, as to be in part reduced into running quicksilver; and, while it possessed considerable volatility, was perfectly irritating. Some of this powder being strewed upon the hot iron placed below, was immediately converted into smoke, which surrounded the patient's body, and after some time settled on his skin in the form of a white and very fine calx of quicksilver: a complete dress, having its inner surface fumigated with the same powder, was then put on.—The remedy being thus generally applied to the mouths of the cutaneous absorbents, soon got admission into the

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circulating fluids; and the constitution became thereby more speedily affected than by any other process known before.

For a more particular account of the chemical preparations used by M. Lalouette, and his manner of employing them, I must refer to his treatise, which was published in 1776.

With regard to the process, I would only farther observe, that the feelings of the patient during it, are not at all unpleasant, provided the heat be properly regulated; that there is nothing uncleanly or disagreeable in the powder applied to the skin; and that all who have had an opportunity of comparing it with the common method by inunction, have been highly pleased with the superior advantages attending it.

C A S E I.

In Sept. 1788, a young man had both his tonsils affected with venereal ulceration. This complaint came on after a bubo; and a great deal of mercury had been given for it without effect; for, being naturally healthy, and his bowels not easily disturbed, he had taken, on an average, from two to three grains of calcined quicksilver, or calomel joined with opium, every day for three months; and had also used mercurial ointment during the same period, beginning with two drachms, and gradually increasing it to an ounce daily: besides which, he had for a short time taken a solution of hydrargyrus muriatus. Yet all this scarcely produced any soreness of his gums, or caused any visible amendment in the ulcers of his throat; the only effect it had, being that of preventing them from becoming worse. His bowels indeed were occasionally disturbed by the medicines, but were easily quieted by opium. To rub in the quantity of mercurial ointment used towards the latter part of the course,

course, the patient spent nearly an hour and half every night and morning; but as he became weaker, he perspired considerably in consequence of this exercise, which tended to frustrate his endeavours by preventing, or at least greatly diminishing, the absorption of the medicine.

No ground being gained by pursuing this plan, Mr. Blicke recommended mercurial fumigation according to Lalouette's method, which he had occasionally employed with success, and which would not only relieve the patient from the fatigue of rubbing in the ointment, but prevent any farther irritation of his bowels, by superseding the internal use of mercury. The patient was accordingly exposed, for half an hour each night, to the fumes produced from half an ounce of the powder already described; by which means, in less than a fortnight, his constitution and mouth became properly affected by the mercury; the ulcers healed soon afterwards; and in less than a month he was permitted to discontinue the remedy.

I could relate many other cases in which fumigation accomplished, with facility, the cure of complaints which had resisted long-continued mercurial courses both by friction and internal exhibition; but I have selected this, as being rather a striking example of the difficulty which we sometimes experience, of introducing into the system, in the ordinary modes, a sufficient quantity of mercury to affect the constitution. It is reasonable to think, that this object will be more certainly obtained by the absorption thus taking place from almost the whole surface of the body, than by any other method hitherto devised. Yet it is but right to say, that my hopes of success from it have not always been fulfilled; and that, in some few cases where mercury shewed a particular tendency to act on the bowels without affecting the mouth, the mercurial fumes seemed to produce this effect even sooner than the ointment had done: and in one young man, whose mouth neither frictions nor the internal use of mercury could be made to affect, but in whom they occasioned constant tremors of the muscles,

cles, and spasms of the bowels, the fumigations were not attended with any better success. Happily, however, such cases are rare; and in general the fumigations affect the constitution speedily, and in the usual manner.

The remarkable benefit resulting from this method of fumigation in the case mentioned above, rendered me very solicitous to introduce the practice of it into the hospital. I accordingly got a quantity of the powder prepared at the laboratory; and by using it rather more liberally than M. Lalouette directs, I found that I could in a very short time completely affect the constitution; a circumstance which I consider as a very important advantage attending this mode of employing quicksilver. Although I had satisfied myself both of the speedy and effectual operation of the medicine, exhibited in this manner, I did not, however, persist in its use; for I judged, that though the experiment should prove harmless, it could not be proper to excite a sudden and powerful constitutional affection by this mineral,

ral, where neither the obstinacy of the case nor the rapid progress of the disease particularly called for it.—Out of the six cases of which I took notes, I shall relate only one, to shew how quickly, by this mode, the medicine can be made to operate.

As the fumigating powder used by M. Lalonette was a very operose, and consequently a very expensive preparation, and appeared to have no advantages over one made by abstracting the muriatic acid from calomel by means of volatile alkali, I have always employed the latter, which is prepared at the hospital in the following manner: Two drachms of aqua ammoniæ are added to six ounces of distilled water, and four ounces of calomel are thrown into this liquor, and shaken up with it; the powder is afterwards separated by a filter, and dried.

The powder thus obtained is of a grey colour, and contains a good deal of quicksilver in its metallic state, which of course is extremely volatile, but becomes oxydated when raised

raised into fume, and afterwards condenses into a white and very fine dust.

This mode of using mercury is not, however, so well adapted to hospital practice; for sometimes the iron was too much heated, and the patients were made by this means to perspire profusely, so that the powder was formed into a paste, which was irregularly incrusted on the skin; besides, the patients either could not or would not wear a complete under-dress; and in that case the powder was wiped away, and the plan of treatment frustrated: for the design is to allow of a constant absorption of this subtil preparation of quicksilver from the whole surface of the body.

C A S E II.

A young woman, twenty-five years of age, was admitted into the hospital, with chancres and a venereal fore throat. Both tonsils were enlarged, and on each there appeared a deep ulcer about the breadth of a shilling; having white irregular edges. On the 19th of December,

ember, half an ounce of the powder was used at one fumigation ; which treatment was again repeated with the same quantity on the night of the 20th, and both on the night and morning of the 21st. As she then complained of head-ach and faintness, the fumigation was discontinued. On the 23d, her gums were much swelled and very sore : the prominent margins of the ulcers in her throat had subsided greatly, and the surface of the tonsils now hardly appeared to be ulcerated. During the three following days, the soreness of the mouth increased, and in that time the ulceration in the throat had become scarcely visible : the chancres also were healing fast. On the 27th, two drachms of the powder were used in fumigation ; and the next day she was seen by all the surgeons of the hospital, who agreed that her mouth was too sore to justify the continuance of the remedy.—On the 1st of January, her mouth remained properly sore ; the chancres were quite healed ; and only a slight redness was perceptible in the throat, which seemed more like the effect of mercurial irritation, than of her former disease.—On the

the 2d of January, two drachms more of the powder were used. On the 4th, her mouth was less sore; and Mr. Blicke having examined her, considered her complaint as perfectly cured. To make more sure, however, I directed that she should be fumigated with two drachms that day, and the same to be repeated on the 6th; after which she was discharged from the hospital, and promised to come back if she found any return of the disorder.

The other cases in which this method was tried, were so similar in their circumstances and events, as to render a particular recital of them unnecessary. In every one, a considerable affection of the constitution was excited in the space of three or four days. It is to be presumed, that these patients had no particular idiosyncrasy in respect to the operation of quicksilver. Those who are affected by that medicine slowly and with difficulty, might perhaps have withstood its action for a longer time.

It

It may surely be an advantage to be able, in the generality of patients, not merely in venereal, but in other diseases, to produce so sudden and complete a *mercurial* affection of the system.

I have heard it objected, that fumigation cannot be depended on for the cure of lues. But I never knew it fail, nor do I see why mercury, used thus, should, when absorbed, prove less effectual than when this mineral is combined with lard in the common ointment. If fumigations in this mode have failed, it was more probably owing to their being improperly managed, than to any insufficiency peculiar to them. Thus, if administered frequently and largely at first, they may have considerably affected the mouth without proportionally affecting the constitution in general; or, from the quickness with which they heal venereal ulceration, the cure may have been too soon supposed complete, and their use discontinued before they had entirely eradicated the disease. Under proper management, I have no doubt but mercury, employed

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in this manner, will be found adequate to the cure of every variety of the disease.

Besides their general application, there is another way in which mercurial fumigations may be occasionally employed with advantage, though the benefit is less important; and perhaps this method may be regarded merely as a refinement in the practice of surgery. In local disease of the joints, such, for instance, as frequently takes place in the knee, and in sarcomatous enlargements of the breast in women, Mr. Sharp and Mr. Blicke have been long accustomed to direct fumigated stockings, or under-waistcoats, to be worn; when the complaints have been relieved, and the constitutions of the patients affected, without the trouble and unpleasantness arising from the use of the common mercurial ointment.

The information which the author of these Essays had acquired in the practice of his profession,

feſſion, and which he has in theſe pages ſubmitted to the public, was not obtained without labour ; nor could it have been acquired unleſs he had poſſeſſed opportunities which do not fall to the lot of many ſurgeons. Theſe obſervations were therefore publiſhed from a belief that the knowledge, which he eſteemed of ſome value, might be likewise conſidered ſo by others, who had not the ſame means of obtaining it.—Continual employment of other kinds has prevented the author from paying that attention to the finiſhing of theſe papers, which the public have a right to expect : he however felt, that if their publication was poſtponed, other engagements and purſuits would occupy his attention, and render him leſs capable of offering them even in their preſent ſtate.

